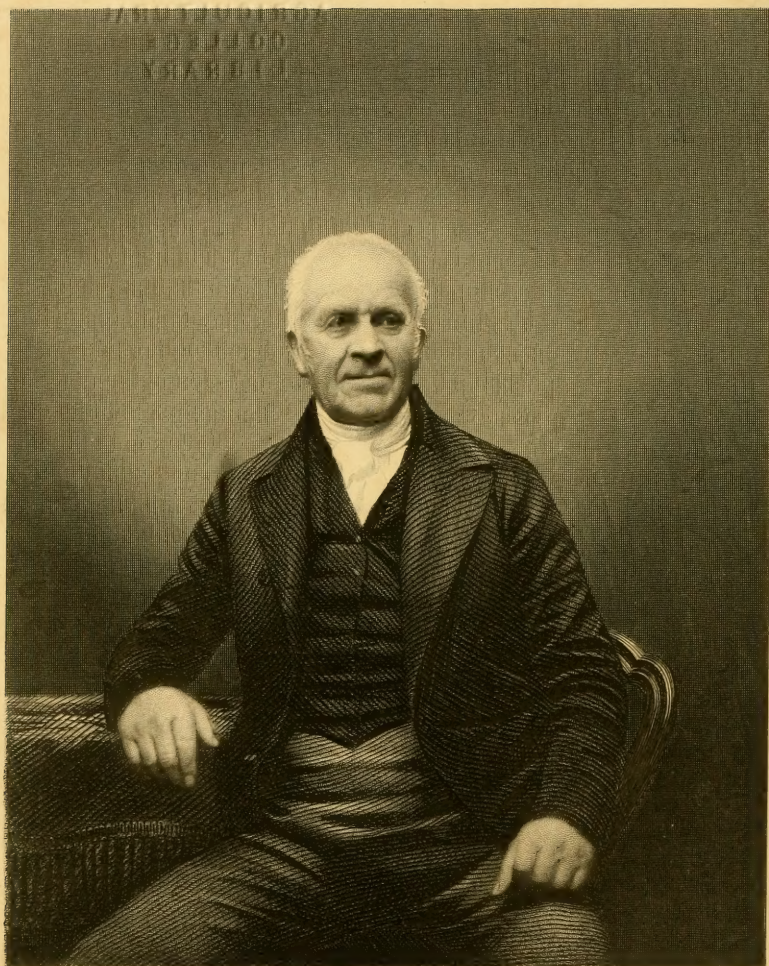




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Theophilus Chapman

THE FARMER'S MAGAZINE.

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VOLUME THE TWENTY-SECOND.

(SECOND SERIES.)

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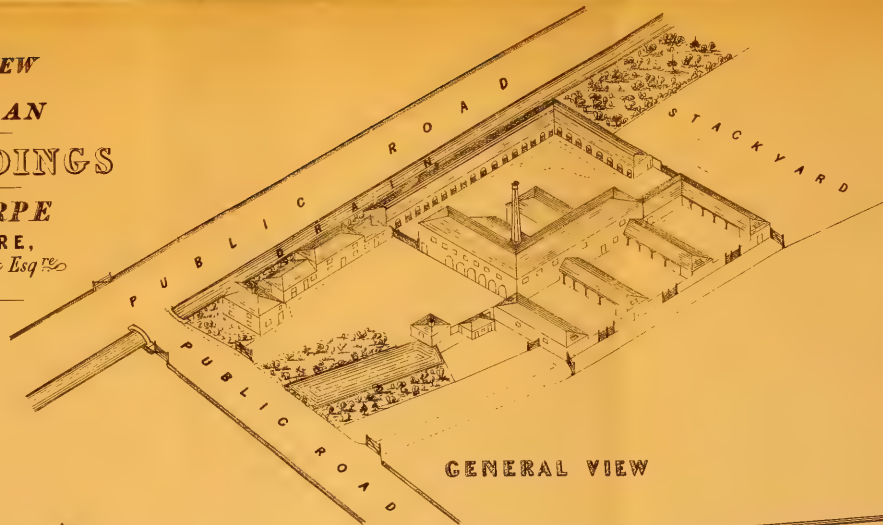
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GENERAL VIEW
AND
GROUND PLAN
OF THE
FARM BUILDINGS

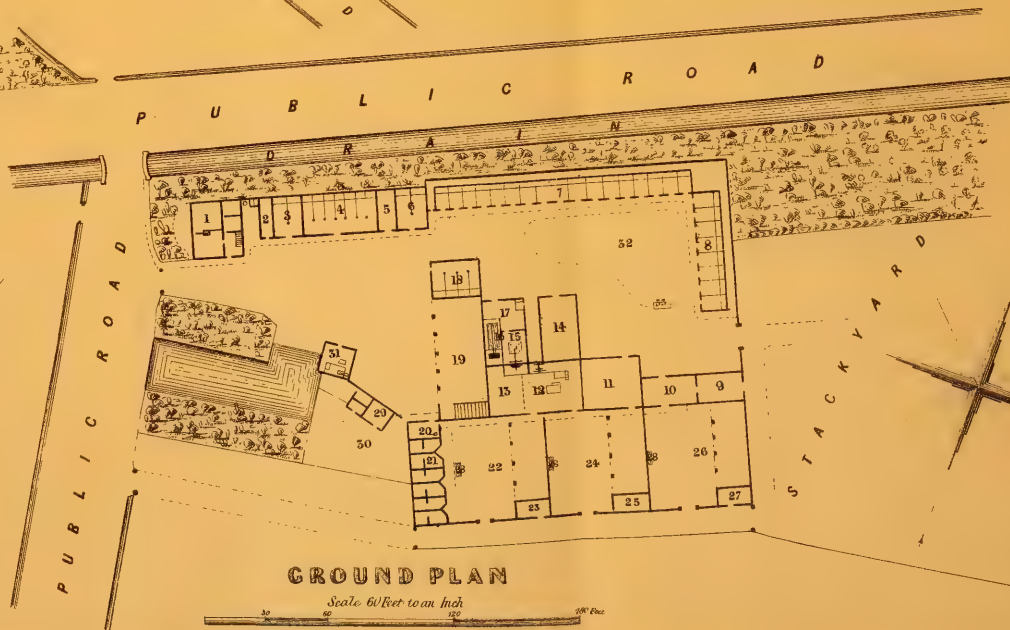
AT
TRUSTHORPE
LINCOLNSHIRE,
Belonging to William Loft Esq. Esq.
1850.



GENERAL VIEW

REFERENCE

- 1 Foreman's Cottage, with two living rooms, three bed rooms over, and Offices
- 2 Coal House and Washhouse, 18' x 8'
- 3 Cart-house for three Cows, 18' x 4'
- 4 Draught horses' Seven Stall Stables with Dove Cote over, 41' x 13'
- 5 Gear House, 18' x 7'
- 6 Stables, 18' x 16'
- 7 and 8 Twenty five Stacking Boxes 10' x 8' each
- 9 Drill House, 24' x 16'
- 10 Root House, 25' x 16'
- 11 Straw Barn, 50' x 24'
- 12 Two Dressing machines on the ground floor with Thrashing machine, Cider, and Corn Crusher above
- 13 Cart House, 16' x 24'
- 14 Corn Barn, 33' x 22'
- 15 Engine (eight horse power)
- 16 Boiler with Drying chamber above
- 17 Coal and Engine house
- 18 Draught Horses, four stalls, stable, 24' x 17'
- 19 Cows and Waggon house, 62' x 24' with Oratory over No. 18 and 19
- 20 Pump and Tool house, 16' x 12'
- 21 Riggeries each 6' 9" x 8' 6" and 6' 9" x 7' 6" with Ben house over
- 22 Fold Yard with Open Shade, 60' x 50'
- 23 Loose Box, 16' x 9'
- 24 Fold Tent with Open Shade, 52' x 50'
- 25 Fold Tent, 16' x 9'
- 26 Fold Yard with Open Shade, 55' x 50'
- 27 Loose Box, 16' x 9'
- 28 Water
- 29 Poultry house, 24' x 13'
- 30 Poultry Yard
- 31 Blacksmiths Shop
- 32 Pit for Manure
- 33 Liquid Manure Tank



GROUND PLAN

Scale 60 Feet to an Inch



THE FARMER'S MAGAZINE.

JULY, 1850.

No. I.—VOL. XXII.]

[SECOND SERIES.

PLATE I.

PORTRAIT OF MR. THOMAS CHAPMAN.

ENGRAVED BY J. B. HUNT, FROM A PHOTOGRAPH BY CLAUDET.

PLATE II.

GENERAL VIEW AND GROUND PLAN OF THE FARM BUILDINGS AT TRUSTHORPE, LINCOLNSHIRE,
BELONGING TO WILLIAM LOFT, ESQ.

MEMOIR OF MR. THOMAS CHAPMAN.

“We, the undersigned, entertaining as we do the highest sentiments of regard and respect for the character of Mr. Thomas Chapman, of Stoneleigh, who for nearly three-fourths of a century passed in active public life, has ever been found a zealous supporter of British agriculture, and an earnest promoter of every improvement that has had a tendency to advance its interest, benefit his country, and produce that harmony and good understanding between landlord and tenant that tends to the mutual advantage of both—feel extremely anxious to mark our sense of his high and sterling integrity by handing down to posterity a memorial of the friendship and esteem we feel for him in private life, and of our warm admiration of his public conduct: we therefore earnestly request him to allow us the opportunity by sitting for his portrait.”

The duty of selecting men, no matter of what class or occupation, to hold up as examples to their fellows, must always be a trying and an anxious one. To examine their merits with a feeling entirely

freed from all partiality or prejudice is one of the first, but by no means the only requisite, for a proper discharge of the office so undertaken. Many and various may be the acquirements and acts that lead to any name being determined on; that selection, however, once made, the introducer stands for ever committed to it, as with him rests the responsibility of showing to the public those reasons and causes that prompted him to pay honour where he judged honour was due.

In direct contradiction to the time-honoured saying that “No man is a prophet in his own country,” we would venture to assume that in no place is a useful *good* man so thoroughly appreciated. It is in his own country, or his own parish, that you have his public, and may be more “showy” character confirmed; it is here that we trace out the value and stability of that we have been taught to look up to and respect in a more general company, and under less favourable opportunities of ascertaining its real worth.

OLD SERIES.]

The words of the testimonial we have quoted say so much for the character of the EMINENT BRITISH FARMER we have this month included in our gallery, that we feel we might very justly leave the portrait without another word in justification of the choice we have made. It does all we could wish, even to proceeding to the likeness (though for the use of private friends only) that we are now enabled to offer more publicly and generally, and as a key to which we furnish the few further remarks.

Mr. Thomas Chapman, now upwards of eighty years of age, has occupied a prominent position in the agricultural world for more than half a century, during which period he has done much for the advantage of others, and deservedly established an enviable degree of credit and respect for himself. Within the last twenty years he accepted the agency of Lord Leigh, and went for that purpose to Stoneleigh, in Warwickshire, where he still continues to reside. Prior to this he had been extensively engaged as a valuer in the midland counties, more especially in Leicestershire, Staffordshire, and Warwickshire; a profession for which he was singularly well adapted from a great practical knowledge, combined with proportionate physical strength, indomitable energy, and high mental ability. The result of such faculties frequently and earnestly employed could scarcely fail to be otherwise than highly favourable; and the name of Thomas Chapman is, and long has been, proverbial for soundness of judgment, independence of character, and honesty of intention.

It is not, however, merely for his usefulness as an agent, or his integrity as an arbitrator, that we class Mr. Chapman as an eminent farmer. He is entitled to the rank in the fairest and most literal acceptation of the term, having now for many years occupied a farm at Drayton, in Leicestershire, where his repute as a cultivator of the soil and as a breeder of stock has long been established. Without ever professedly setting up for a breeder we may mention his success in the selection and propagation of Leicestershire sheep, as well as with a superior kind of pigs. It is, indeed, as a judge of stock that the subject of this notice is perhaps best known as a public man: his long experience here again, quickness of perception, fineness of touch, and love of symmetry furnishing him with superior qualifica-

tions for amply discharging the duties of an office he has so often been called upon to fill. At the Smithfield Club he has on several occasions acted as steward, only going out after three years' service the Christmas before last; as well as being frequently chosen as one of the judges both for the shows of that club, as also of the Royal Agricultural Society of England. In the local agricultural associations he is, as may be expected, even still more in request, and was, in fact, one of the originators of the Warwickshire Society for giving Premiums to Tenants and Prizes to Stock—an institution in which he continues to take the greatest interest, and to afford some of the best support.

It sounds almost superfluous to add that with such attainments, and so generally recognised an authority before the world, Mr. Chapman should have commanded the respect and gained the friendship of many gentlemen celebrated for their success in the same pursuits as he himself had devoted his talents and energies to. The testimonial, for instance, with which we commence this paper was signed by the late Lord Spencer, and many other peers of the realm; while the closer intimacy and fellowship of such men as Mr. Pryce, of Riall, Mr. Buckley, of Normanton, and indeed of almost every famed breeder, over the merits of whose produce he has been called upon to decide, stamps the truth and worth of Mr. Chapman in a sphere where Englishmen know peculiarly how to appreciate them.

The life of a man whose energies have been devoted to useful labour rarely furnishes those points to dilate on, or those incidents to enumerate, we frequently find in the career of others whose ambition may have been of a more imposing kind, but whose progress can never be of more sterling service. The memoir of the utilitarian, in short, is summed up in a few words, as in the testimonial before us: it gives the fit attainment of as good an aim, and supplies a moral and an example that all may profit by remembering and adopting. It is a position to be reached, not by one lucky hit or brilliant thought, but rather by a whole course of useful conduct directed by the soundest discretion and highest principle. In this manner has Mr. Chapman reached it, and in this wise do we acknowledge him here, as one who, in the words of those who know him best, has done much "to advance the interests of agriculture and to benefit his country."

ON THE RISE AND PROGRESS OF AGRICULTURAL IMPROVEMENT.

No. II.

BY M. M. M.

Doubtless the withdrawal of the Roman power gave a check to the development of agricultural improvement. The warlike Saxons were more of a pastoral than a cultivating people, and followed the depasturation of animals like the previous sojourners in Gosham. In their time so low had the estimation of agriculture fallen, that an acre of land sold for 16 Saxon pennies in the reign of Edgar the Peaceable, or about four shillings of our money; and so little was cultivation attended to, that when the population was so thin, like all previous pastoral people, they were often subject to famine. So much did this prevail, that in the year 1043 a quarter of wheat sold for 60 Saxon pence, equal to 15 of our shillings. In these days it is clear there is little material for a history of agricultural improvements. Indeed it seemed as if all the knowledge which had been attained had been lost by the presence of this new race of warlike shepherd-kings.

The Norman conquest gave a slight impetus to agriculture. One of the retainers of the conqueror, Richard de Rulos, inclosed and drained a great extent of country, and embanked the river Wielland, and is described as being so zealous an improver as to make the country a "garden of delights." His object was, however, probably more to obtain pasturage for his horses and cattle, which he delighted in breeding; and so far pastoral did the *animus* of the country remain, that the *wool* rather than the *corn* seemed for centuries to be the great object of attraction. And when a prohibiting law was first put on corn, in the year 1463, the object of the foreigner seemed rather to be to obtain a supply of English wool than a profit for the corn. The real revival of British husbandry was, I apprehend, due to the introduction of agricultural literature. The "*Boke of Husbandrie*," by Sir A. Fitzherbert, one of the Judges of Common Pleas, published in 1532, was the beginning of a series of valuable productions, in which all the practical system of the classic writers was reduced to British comprehensions. He was followed by Tusser, who wrote his "*500 points of Good Husbandry*;" by Sir Hugh Platt, who published a work in the quaint style of the age, entitled "*The Jewel House of Art and Nature*;" he was again followed by Blyth, the deep drainer, in the time of the Commonwealth; he again by Evelyn, Hartlib and Norden, Mortimer and Jethro Tull, Bakewell,

Arthur Young, Marshall, Lord Kaimes, and others, bringing us down to the period of the great revolution in agriculture, by the publications of those who began to apply scientific discoveries to farming, commencing with Sir Humphrey Davy and terminating in Liebig.

It would be wrong not to glance for one moment at the state of the agriculturists in those dark ages, by which it will be shewn how impossible it was for any great or permanent improvements to be made by a class so degraded.

Fitzherbert described the farmers' wives' occupation to be, to "winnow all manner of corne, to make malt, to wash and wring, to make hay, to shere corne, and, in time of nede, to help her husband to fill the muck wayne, drive the plough, load hay, and such other."

Hugh Latimer's father is described as having a farm of £3 or £4 per year, kept half a dozen men, had a walk for 100 sheep, and his wife milked 30 kyne, married his daughters with £5 a piece, kept hospitality with his neighbours, gave alms to the poor, educated his son at Oxford, and all this out of a £4 per annum farm.

We cannot give a better idea of the disposal of the profits of a farm than given by Tusser, who divided it into ten divisions, making the following allotments:—

1. One part cast forth for rent due out of hand;
2. One other part for seed to sow thy land;
3. One other part leave parson for his tyth;
4. Another part for harvest sickle syth;
5. One part for ploughwrite, cartwrite, knacker, Smith;
6. One part to uphold thy teams that draw therewith;
7. Another part for servants and workmen's wages laie;
8. One part, likewise, for fillbellie, day by day;
9. One part thy wife for needful things doth crave;
10. Thyself and thy child the last part would have."

A recent writer on the history of agriculture, Chandos Wren Hoskyns, Esq., ascribes nearly the whole of our present advanced state of agricultural science to Jethro Tull, and endeavours to establish the fact that his theories were the basis of all or most of the great improvements of the present

day, by the application of physical science to bear upon the increase of the productions of the soil. He says, "The life of Jethro tull exhibits all the phenomena which have usually marked the career of a great and original discoverer. Pursued by rather than pursuing one ruling idea, his errors and excesses, as they are called, are as instructive as his most successful experiments. The very failures to which they led, through causes unforeseen, tended to pare down and expose in its truer proportions the simple and fundamental principle which he dimly saw, and only missed the full attainment of by the want of a helping hand from that master-science which the genius of Davy and of Liebig has since held out to later and more favoured experiments." Again he says: "The inimitable researches of Professor Liebig in organic chemistry have since brought to light, step by step, the beautiful mystery of which Tull might be said to have distinguished the form without seeing the face." I cannot help differing from that worthy authority in this conclusion. The great arcana of agricultural improvement, as developed by applied science and vital chemistry, have their first lines deeply laid in principles and appliances long antecedent to Tull; and though his theory might, in some respects, be useful in its way, it is rather in improving some practical details, such as drilling and hoeing, than in developing or even shadowing forth the great outlines of agricultural improvements.

I have spoken before of the pastoral and wool-producing habits of the British farmer, and this with the new element of our long and snow-covered winters forced upon the English farmer the great leading principle of all success in farming—that of growing green crops for the purpose of feeding stock. For this purpose the turnip plant, the sheet-anchor of British farming, was early introduced. Worlidge, a correspondent of the Houghton collection in 1684, says of them—"Sheep fatten very well on turnips, which prove an excellent nourishment for them in hard winters when fodder is scarce, for they will not only eat the greens but feed on the roots in the ground, and scoop them hollow, even to the very skin." The great keystone of improved farming—the alternate system of cropping—was rather laid in the Roman rotations and the sheep-keeping tendency of the English, than any of the everlasting corn-growing propensities of Tull. "Ten acres," says Worlidge, with all the knowledge of modern days, of which Tull never availed himself, and would have despised in his heart—"ten acres sown with clover and turnips will feed as many sheep as 100 acres would have done before."

It was the same pastoral tendency of the British mind which applied itself to the improvement of species of animals as that which provided them food.

And the principles of breeding successful animals have rather been illustrated than discovered by animal physiology, the very principles of that science having being taught before a single scientific axiom had been applied.

The watching of physiological tendencies, and availing themselves of these judiciously in practice, was long anterior to scientific research. Emulating the skill of the wily progenitor of the Jewish race, and intelligently perceiving what was required, a Culley and a Bakewell attempted and attained the production of sheep and of cattle "ringstrated, spotted, and speckled," at pleasure. Seeing the necessity of economising food, they set about producing those animals which came to maturity early, and so produced vastly more animal food from the same amount of vegetation. Knowing that fat was an element of favour in a northern clime, they endeavoured to obtain animals with a tendency to secrete it in large quantities. In order to this they observed the qualities indicative of those propensities; and knowing that it is as true in physiology as in mathematics, that like produce like, they selected and bred from these until they stamped their qualities permanently and invariably and indelibly on the race. With these they managed to combine, perhaps, their invariable concomitant, symmetry; and hence the origin of our improved Leicester sheep, and of our noble short-horn cattle, woven, even in their mortality, with the proud national axiom of the "Roast Beef of Old England."

It is quite manifest that it would be utterly impossible to go through anything like a list of the broadest and most palpable outlines of agricultural improvement in the compass of one short paper, but I will allude to two or three of the great leading characteristics of our times in this respect, and it will not be difficult to trace their origin in the wonder-working transformation of the princely river of one of the first nations of antiquity.

If we observe the warping of Lincolnshire, we see the very identical results; not from a regular flood, because we have no tropical rains to produce it; but ingenuity and skill have adapted the ebbings and flowings of the tide to the production of the same results; a deposit of silt is made to cover the poorest soils, and to convert them into the richest; a slow and gradual accumulation of all the principles needed by vegetation is deposited; and the land before barren and desolate is made, Egypt-like, a land of corn, and wine, and oil and olive, in the wheat, the barley, and fat animals which luxuriate on its fertile bosom.

When the mud is not available, the water only is used. If we go to Clipston Park we shall observe a small insignificant stream transforming, by its talismanic agency, a barren wilderness into a fruit-

ful garden. On one side you have the moss and the gorse and the heather: on the other you have a luxuriant meadow, which six times a year yields its willing fruits to the spirited owner.

Need we look to our drainage and its magnificent consequences?—drying the wet and melting the stubborn surface of our soils—as it is drying our atmosphere and improving our climate, from the Roman-like twig-drains of Berkshire to the pipe-tile of modern science, nay up to the powerful steam-engine which throws up the water of many a swamp, and lifts it into some friendly stream which lies many feet above it. While the first feeble efforts remind us of the Egyptian watering with the foot in the days of primeval simplicity, the drainage of the Lake of Haarlem or the embankments of Holland carry us back to the aqueduct of Hadrian, amongst the civilized Romans.

But in manuring—in restoring the worn-out elements of production to an exhausted soil, has agricultural science triumphed in the most remarkable degree. The tons of suspended matter in a swollen river might convey the idea of an extraneous supply of fertilizing ingredients being necessary; but it would also convey the notion that such quantities were needed as it would be an impossibility for man to convey, even if he knew where to obtain them. If it even taught them to separate and analyze—so as to detect the useless from the good—it might fail of suggesting the source of supply, or the principles or modes of application; and it is not wonderful that all these deep mysteries should only be revealed by an investigation of the whole cycle of the sciences, dependent as they are on each other for modifications of characteristic phenomena. Here organic chemistry, and vital phenomena, and geological research step in; they take the reins, and, with a master stroke, dash away into streams of untraversed extent, dig into mines of unrevealed depth, and soar away into atmospheres previously unguessed of in our narrow philosophy.

They teach us that plants and animals have a connection as mysterious as invariable, forming a beautiful and intricate chain in the contrivances of the Great Lord of all; that the latter cannot exist on the raw materials (so to speak) of nature, but require the former to organize and eliminate them before they can be adapted to their complicated organizations; how the decomposed vegetable becomes capable of building up animal structures, and how the vital principle holds these together until the expiration of the time appointed for all living, when it gives back its elements to its mother earth, again to build up new structures of the vegetable world, to invigorate and feed and maintain a new-born race of animals. It teaches us, too,

how decay is the sustaining agent of vitality, and how intimately bound up are the entire processes of nature in one harmonious whole of microscopic littleness, as of extent unbounded, except by the Infinite.

The Romans might understand the value of the droppings of thrushes, and a cab of doves' dung might be valued at five pieces of silver at the gate of Samaria; but chemistry and geology alone could solve the peculiar principles which afforded food to vegetation.

These, in our days, have taught our farmers that the animal respire from its lungs the starch and the sugar, the gum and the resin, it consumes in the vegetables; that from this air a new race of vegetables receive and re-assimilate it, forming a storehouse for a fresh supply; that the animal body obtains its ammonia, its sulphur, and its phosphorus from the plants it consumes in its lifetime, and surrenders them back at its dissolution; and hence the agricultural chemist is taught, when he wants to obtain his crops, to feed himself or his cattle, that he must supply them with carbon, with ammonia, with sulphur, and with phosphorus. Where in the wide field of nature can he obtain a supply?

The air he breathes will supply carbon; Liebig discovered it will also supply ammonia; animal and vegetable decay will furnish him with sulphur and with phosphorus. But the air alone will not supply enough carbon to grow the luxuriant crop, at which a cultivator for profit will aim; he possesses no means of making the clouds drop fatness, and hence he brings the green crop to his assistance. The leaves are the mouths, and they gather it largely, and those he consumes or ploughs in for a supply for the future. He then begins to ransack the battle fields of Europe for the bones of the warriors who fell in the battle, or he digs into the deeply buried strata for the remains of animal generations long since extinct, in order to feed the living on the remains of the dead.

But it is not enough to give food to a plant or an animal: it must be given in a manner, in a state, in a quantity suited to its demands. Chemistry has stepped in, and taught man to cook the food of his plants as well as of his animals. She knows that the ammonia and the phosphorus are locked up in the bones of the animal, or the organic fossils; and she teaches him to treat them in her laboratory, to unlock their mysterious qualities. She provides the sulphuric acid to liberate their energies, and science triumphs in a noble crop.

Agriculturists now understand the value and importance of deepening the soil. They knew this as a practical fact before they knew the precise scientific principles involved in the practice. Geology and chemistry have taught them the reasons why,

other things being equal, a deep soil is more productive than one that is shallow.

Soil owes its origin to the disintegration of solid rock and the decomposition of vegetable matter. Hence all our rocks soon become covered with a green mantle of vegetation.

The action of rain, of frost, and of the oxygen of the atmosphere is the cause of this crumbling of the rock; and, as each portion from day to day becomes disengaged, the chemical ingredients it contained are left free for absorption by the plants. Now, in order to deepen this stratum of soil, it is necessary either to bring up the bottom or subsoil to the surface, or at any rate so to loosen and lighten the upper soil as to admit the free access of oxygen, of frost, and of water. And when a deep soil is formed, not only is there more space for the roots of the plants to obtain their food from, but there is double the amount of food to secure in the deep soil as compared with the shallow.

Nor is it difficult to trace the idea of the necessity for deepening the soil. It was impossible year after year to see the Nile valley become deeper and deeper in soil, and to see it year after year retain its productiveness, and not find out the value of deepening the soil. Thus again, we trace the outlines of this doctrine of improved agriculture to the physical principles taught by that river whose source was a point of dispute in the times of the Ptolemies.

Nor is this all. The practice of subsoiling is one claimed by the men of this generation, and Deanston is pointed to as the classic place from whence this boon to clay soils derived its parentage and its origin. But it only requires to see the first invented Deanston subsoil plough to observe that in almost every lineament it resembles the plough of the Egyptians.

Connected with agricultural improvement are, as a very first element, improved implements wherewith to work the land. The barbarous plough now used in Russia, and the equally barbarous harrow—composed, as the former is, of unshapely pieces of iron-shod wood, and, as the latter is, of crooked twigs tied together—are an indication of the state in which primitive agriculture was once, and are as opposed in their feeble and scratching operations to the ploughs and harrows of the present day as the spade is an improvement over the turning of the soil with the hand, or the locomotive steam-engine is to the common stage waggon. Whether mechanical science has done so much for farming as it ought to have done, or whether it is but in its infancy, we cannot predict, because we have not the means of judging; but if we now see motions perpendicular, oblique, and horizontal brought into play to aid the cultivator, we may say that it is only

in details, and not in principles, that any great progress can be made.

We need only reflect a moment on the principles which have to guide the strong-land cultivator, in preparing his soil for the seed, and compare the means he had of overcoming his difficulties, say, twenty years ago, with what he has now, and we shall see how very different is his position rendered by the application of mechanical science. We speak not of his profit, abstract or comparative; but we cannot help being struck with the vast difference in his resources of meeting the difficulties of his position. Once he had to plough with three or four horses, and to cross plough with great labour and difficulty, then to harrow with an implement which produced scarcely any impression on the stubborn clods—to plough and harrow, and plough and harrow, whenever he could, until he possibly found it necessary to set his workpeople, in some seasons, to complete his operations with the mallet and the stone hammer, to break the unruly clods. He had to *pulverize* and to *clean*—the one could not be accomplished without the other, and the former had to be effected somewhat in this manner:—First the unctuous clay was cut in long longitudinal parallel pieces by the plough, and left on edge to dry, being divided by a double wedge—a plough—the history of which we have attempted very faintly to sketch in a preceding paper. This mass sufficiently dry to admit of the treading of horses' feet with impunity, is cross-cut all into large cubes, and these are subjected to the action of natural processes. The sun and air dry out all the moisture, owing to the large surface exposed to their action; the weeds are also necessarily killed from the same cause. The moisture abstracted, the clods begin to crack, and show here and there symptoms of fissures by the evaporation of the moisture, forming receptacles for the next rains, which one by one again swell out the particles, and so break down the whole mass into a friable soil, capable of giving a properly elaborated seed-bed for the reception of the seed.

It is evident, therefore, that the elements have much more to do with the formation of the fallow than the mechanical appliances, as the old bare fallow is and has been constituted; and hence the process, like most of nature's operations, is gradual and slow. Now, by the application of a simple share, the weeds, which in soils so very tenacious are generally very near the surface, are merely lifted out of the ground, and so little soil removed with them, that their abstraction becomes a matter of comparatively little consequence. The plough then ploughs up the soil below, and it is soon sufficiently dry to make it a solid cube of soil. Here such an implement as the clod crusher, or some similar

powerful separator of clods, is brought into action, and by once or twice going over the whole, the soil is reduced to as fine a tilth as if it had undergone a whole summer's exposure.

But it is not always that a season suitable for fallows can be obtained in this uncertain climate—there may be too much wet or too little heat, to accomplish the entire destruction of the weeds, and the entire disintegration of the soil—while seasons have to be watched with all the intensity of sunshine in hay time, or dry weather in harvest. A crop of turnips may thus be substituted for a bare fallow, or a crop of corn, by the mere appliance of improved machinery; and this alone will show that in a few years a vast effort has been made in the perfection of the implements of tillage.

The *harrow*, the next implement after the plough—the substitute for the “feet of swine”—used by the Egyptians, is a series of improvements over the twigs and prickles of the shrubs and branches of trees, which were at one period in use for the purpose of covering the seed; and the present bush-harrow gives us not an unapt idea of the nature of the primitive modes adopted to cover the newly sown grain. As lately as 1668, Gervase Markham says, in his directions as to an implement for covering the seed—“Get a pretty big whitethorn tree, which we call the hawthorn tree, and make sure that it be wonderful thick, bushy, and rough grown” p. 61.

For these branches, the first harrows—frames of wood and their tines of iron, the next steps in improvement—we have now the angular, serpentine, or zig-zag harrows, with an action so steady and uniform that the most precise calculation can be made as to their effects upon the land; and in what mode soever they are arranged, they have an action so as to make the incisions of the tines in equidistant and precisely parallel lines.

The *sowing* of the corn by the hand seems to have been the almost universal practice until within a very recent period. Still there is tradition of a dibber, and of a drill, in China; and animals' feet seem to have done their part in treading in the seed when they sowed “beside all waters, and sent forth thither the feet of the ox and the ass” (Is. xxii. 20). Worlidge and Evelyn mention mechanical modes of depositing seed corn with approbation; but Tull may be fairly called the father of drill husbandry; and to carry out his plan of wheat after wheat in succession, wide rows, and horse-hoeing without manure, he adopted holes in revolving cylinders to deposit the seed at regular intervals and in straight lines; and now we have the steerage drill as a perfection of the principle he invented, and so judiciously, though too theoretically, laid down,

Hand-reaping, too, like hand-sowing, was formerly the invariable practice, nor can we now depend upon any process but the hand for the bulk of our agricultural operations of this description. The “sickle” is an instrument used in the times of the most ancient and most authentic, as well as the most venerable of records, and it is for very recent ages to have invented reaping machines; nor can they be depended upon for any but standing crops of corn, and therefore cannot become universally adopted. Early in the present century Boyce invented a machine, which consisted of a vertical spindle, with knives inserted in connexion with a revolving axle, and just cut and strawed the grain on the ground, having no provision for gathering it. Plunket's machine substituted the saw, or serrated knife, for the plain one; and Gladstone was the first who adopted a mode of collecting the cut corn in parcels, thus saving the waste and destruction which any indiscriminate depositing of the corn would occasion. Ogle's machine, depicted in the 5th volume of the *Mechanics' Magazine*, the invention of a Birmingham schoolmaster, comprised an apparatus for collecting and leaving the corn in sheaves, as well as for cutting, and was calculated by the maker to cut fourteen acres per day. Mr. Smith's (of Deanston) machine was a revolving barrel with spikes to collect the corn, and fitted with cylindrical knives below; it was pushed before two horses, and was exhibited at the Liverpool show of the Royal Agricultural Society of England.

But perhaps Mann's machine is that which accomplishes the most of the requisites of a reaping machine, and may be of great utility in a season when, from inauspicious weather, or any other cause, there is much delay in cutting the corn. It was made in 1822. It is described as having “a revolving polygonal cutter of 12 equal sides, and produces its cutting effects by a very rapid series of strokes; it gathers the cut corn by means of revolving rakes, and strips these in such a manner as to lay down the corn in a regular swathe; it is drawn by one horse walking alongside the standing corn; and it cuts a breadth of 3½ feet at each turn, and is capable of cutting about 10 acres in 10 hours.”

The efforts which have been made to construct reaping machines, show the disposition there is to invent machinery to diminish the amount and intensity of hand labour, and the great difficulties the agriculturist has in overcoming the natural obstacles arising from the peculiarities of his occupation.

Connected with reaping is the cutting of grass and making of hay, which both seem to be naturally manual operations. For garden mowing, a machine a step in advance of the scythe, and only a very meagre one, has been adopted; but a more power-

ful implement has supplanted the use of the rake in spreading and turning. The peculiarity of hay-making, restricted to the times when the "sun shines," involves a great amount of work in a little time, and hence machinery here is of the greatest value. A machine, or "devil," as the clawed and disturbing monster is called, will spread or turn as much hay as 20 women, and in much less space of time; so that for large properties it has undoubted advantages. The great difficulty with this machine have been the inequalities which generally occur on grass land; but even this has been obviated by a very ingenious implement of Mr. Smith's, of Stamford, which has for many years carried away the palm of victory at successive shows. By means of a set of springs the rakes have a double action, so that any resistance, in either direction, while the machine is in motion, will instantly call the spring into operation and reverse the action of the rake, so as to allow it to escape. The strength of the spring is, nevertheless, sufficient to resist the weight of the grass only, so that it operates when it is wanted, but gives way at any great degree of resistance. It is difficult to conceive an improvement in so perfect an implement.

Connected also with reaping and cutting, is the question of thrashing; and here, as the material is collected into a more manageable compass, the idea of machinery is more natural, and its application more facile. Hence, in very early ages, we have clear indications of animal power being substituted for manual, in this operation. The flail may have been the first instrument, but it was certainly superseded at a very early period. Thus one of the merciful laws given to the chosen race of Israel was, that "Thou shalt not muzzle the ox that treadeth out the corn"—or as the margin has it, "thresheth"—Deut. xxv. 4. Young animals were early taught the operation, and loved it, doubtless from the above provision, as the prophet Hosea incidentally proves by comparing one to Ephraim—"Ephraim," he says, "is as an heifer that is taught and loveth to tread out the corn" (Hos. x. 11.) But that a more complicated and real threshing-machine was in use is evident, for Isaiah xxviii. 28, says—"He will not ever be threshing it, nor break it with the wheel of his cart, nor bruise it with his horsemen." Nay, more: we are told in the preceding verse that "fitches are not threshed with a threshing instrument, neither is a cart wheel turned about upon the cummin"—perhaps because of the tendency to bruise it, and hence we may infer safely that other instruments than wheels and treading were then in use. This is also sufficiently indicated by the beautiful imagery of that poetic passage—"Behold, I will make thee a new sharp threshing instrument having teeth; thou shalt

thresh the mountains, and beat them small, and make the hills like chaff" (Is. xli. 15.) Whether any recently adopted threshing instrument were here indicated or not, we have no means of knowing; but its sharpness proves that the edges, we apprehend, were of some unequal or fluted surface; nor can the teeth fail to remind us of the modern "peg" principle; while its power is indicated by the image of threshing the mountains "small." It is not difficult to imagine every expression here, to refer to the modern threshing-machine.

In our own country the first important attempt recorded to make a thrashing machine was in the 18th century, when one Michael Margies, a Scotchman, invented some series of flail-like contrivances; and of one similar attempt at Knaresboro', in Yorkshire, it is reported that his invention unluckily caught his own body, and gave him an unmerciful pummelling instead of the corn, and from which he must have perished, had he not been rescued by his wife. The rollers and beater appear to be a more recent invention—so late as 1795 (Tubb's Patent).

We shall just allude to winnowing machines, as they are the only implement now required to fit the corn again for its seed-bed, and these have formerly been very rude and imperfect machines. The wind was, doubtless, the first mode used to separate the chaff from the grain; and a shovel appears, by the prophet last quoted, to have been used for turning over the corn; and when the wind might not be propitious a fan was made suitable: Thus he says—"The oxen likewise, and the young asses that ear" (or plough) "the ground, shall eat clean provender, which hath been winnowed with the shovel and with the fan" (Is. xxx. 24.) This idea of plenty, nay, of luxury of clean provender, is associated with the condition of the lower animals in that glorious millennium to which the prophet here refers. How different now from the complicated dressing-machines of Mr. Cooch, Mr. Hornsby, and others, which combine every nicely-adjusted motion, for not only separating the chaff from the wheat, but the fat and rank ears from the "stunted and ill-favoured."

Such are a few of the instances of the vast strides which in the course of a few centuries have been accomplished by the aid of mechanical inventions. And can we say that what has hitherto been done is at all approximating to what may be? We know so little of the future, so little of man's ingenuity, man's skill, man's forethought—nay, of his power to subserve the laws of nature themselves to his use—that it would be idle indeed to risk an opinion. We know that it is possible to make implements for cutting drains—we see not now perhaps, or we see imperfectly, the exact ways and means, we can

only conceive a bare possibility; but plans may be in embryo which will develop its complete triumph.

We have witnessed attempts to make an instantaneous fallow. Messrs. Winrow and Carey, for instance, invented a machine—powerful and cumbersome it is true—which was to destroy insect, seed, and weed, by a jet of steam issuing from its rear; but being before the spirit of the age, it failed even before its embryo blossoms developed themselves ever so little.

We have seen, one after another, steam-engines for tilling the land, and other general farm operations; but they seemed to fail in producing the desired effect. And why, we would ask, if the manufacturers can economically avail themselves of the use of steam-engines, why may not agriculture derive an advantage at least approximating, from the exercise of the same vast motive power? But it must be borne in mind that the farmer has always one natural law to contend with, from which the manufacturer is free. The latter may, in a building of comparatively small area, carry on a business involving the expenditure of tens of thousands of pounds; nor will any reasonable increase of business invariably involve a great increase of premises. But after a certain point is attained in farming, there must be a vast increase of area to increase materially the produce; and hence to embark a very

large capital implies a very large employment of power—for distance from the motive power always implies waste of that power. Nor can the farmer have locomotive power but at a great sacrifice, and at a great loss; and the whole farm cannot be made into roads adequate to convey the ponderous locomotive, and the soil is by far too unstable and yielding to admit of its passing over it without them. This has been the real barrier to the general employment of engine power to agricultural operations; and how far the genius of man may in time totally overcome it seems at any rate questionable. Indeed it is difficult to conceive any plan to effect it but the engine laying and taking up its own railway, and this was attempted by Mr. Heathcoate some years ago; and though it was an experiment of the highest interest, and manifested great skill and power, they were not able to make it either generally applicable, nor even useful in that particular case—one indeed specially adapted for its employment.

Still we would not limit the powers of man, nor doubt the possibility of what is confessedly within their range, but wait until some fresh mind is brought to bear upon the point, and see what new ideas can produce on a subject so complicated, and so beset with difficulties.

Sowerby, Thirsk, June 10, 1850.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. III.

So important are cleanliness and perfect freedom from taints of every kind, in all the operations of the dairy, that I would urge particular attention to the milk vessels, and the construction of the milk-house itself. Where they can be afforded, vessels of glass, of Wedgwood ware, or of porcelain-lined light metal, are to be preferred, as are also marble shelves, polished-tile flooring, or perhaps the new enamelled slate. Wooden utensils are generally employed; but they retain damp, and thus are apt to acquire and retain a faint musty odour. These contingencies must, above all things, be avoided.

The hours of milking are usually seven in the morning and four in the afternoon; and these, if once adopted, should be punctually observed. Some persons milk three times in the 24 hours, if the weather be very warm; but, under any circumstances, the cow or cows ought to be supplied with some kind of food most agreeable to them. Sweet hay is in winter to be preferred, and in

spring and summer some green fodder, cut a few hours before, and a little aired to carry off moisture. This food ought to be placed in a small trough, at an height most convenient to the animal, for too much attention cannot be paid to secure her comfort. Violence of any kind ought to be avoided, for to this may be ascribed the obstinacy and other troublesome habits which milkers complain of. If a cow be kindly treated from the first, if she be at all times coaxed and agreeably fed, she will seldom withhold her milk, or be inclined to resist the dairy-maid, or kick over her pail of milk.

In every case where it is the primary object to obtain cream and butter, instead of rearing and fattening the calf, we would recommend that, so soon as possible after the entire abstraction of the "biestings," the calf should not be permitted to suck the mother, but be either brought up by hand or transferred to another or foster mother, because great inconveniences may and do result from habits

formed by long indulgence; and it is a fact, however unaccountable it may appear, that when a calf continues to suck, though partially as to its own requirements, the milk drawn by the hand is always deficient in cream, so much so as to be insufficient to supply much butter! In milking, the last drop that can be abstracted by tender and judicious "stripping" must be obtained; otherwise, as Dr. Anderson taught us long ago, the loss of the last half pint of milk would implicate that of cream to an extent equal to all the cream contained in eight whole pints of the earlier drawn milk. The mystery of the phenomenon has at length been solved by a physiological investigation of the udder; and it has been proved that the latter rich milk, when retained, coagulates; and if the error be persisted in, either through indolence or ignorance of consequences, not only a great loss of milk will be sustained, but the risk of serious injury to the udder itself incurred. I refer, on this subject, to the "Book of the Farm," part ii., page 522.

At whatever hours (whether twice or thrice a day) a *meal of milk* has been obtained, it should be immediately taken to the dairy, and strained into the dish through the milk sieve. A very little cold water is to be put into the milk-pail, with which it is rinsed; and then the rinsings are passed through the sieve into the body of the milk. This rinsing effects a double object; it cleans the utensils, and somewhat dilutes the milk with a pure *cold* fluid, which also is found to hasten the separation of the cream. In large dairies it would be wise to follow up the indications of nature, and to add a very small quantity of carbonate of soda, in solution. Fresh drawn milk presents a slightly sodaic alkaline reaction; and therefore a grain or two of the crystals of soda dissolved would counteract, so far, the tendency to acidity which milk evinces.

Creaming.—In any weather cream ought not to remain on the milk beyond three milkings, or from 20 to 22 hours—in very hot weather only 18 hours. Thus, if the cows be milked three times a day, the cream of the previous mid-day's milk should be skimmed off in the following morning, and at mid-day the milk of the previous evening should be creamed; again, it would be most safe to anticipate the operation by one meal, for the following simple but imperative reason—that, "the milk should on no account be allowed to turn sour *before* the cream is taken off, because the cream off sour milk always makes bad butter;" whereas, let sweet cream become ever so sour *after* being taken off *sweet milk*, and no harm will accrue to the butter."

My experience refers chiefly to the management of one cow only: and though for several years we milked only twice a day, and made butter only once a week, we never failed in consequence of the milk

becoming sour before the cream was skimmed off. A cool un-sunned dairy will rarely fail to preserve new milk.

Every time a fresh portion of cream is added to the cream jar the contents of that vessel should be stirred with a clean stick kept for the purpose, so as to thoroughly blend the whole of its contents. These soon become sour, and on no account should be kept beyond a week, in cold weather, before they are churned; otherwise a bitter taste may be acquired. In warm weather the churning should be made twice a week, however little the quantity of cream may be.

The heat of the cream is, and has been, the perplexing and vexed question. It can be, however, definitely solved; for, if 62 degrees of Fahrenheit's scale be never exceeded, butter of good quality will be the result, even in hot weather. In winter, however keen the weather, provided that degree in the cream be obtained, the labour of churning will be trifling, for the separation of the butter will assuredly be effected in about 30 minutes. From 60 to 62 degrees furnish the *limits of certainty* at which—the cream being good—the best fresh butter of the season can be obtained; and either of the degrees can be commanded by the judicious use of ice in a cool room during summer, and, in winter, by bringing the body of cream in the jar to the full required heat, by placing it on the hob of a stove, or in a vessel of hot water, the churn itself being also washed with the same till of a corresponding temperature. The facts asserted above have been confirmed by a steady course of experiments; and though we ourselves were not, 15 years ago, fully aware of the precision which it is *now* certain can be at command, we were but too frequently perplexed by the results of a too powerful degree of heat after midsummer, and wearied out by the hard labour of churning for six or more hours, without any product, during the depth of a frosty winter.

Having thus alluded to data, which if acted on will, I think, demonstrate that no longer time than 30 to 40 minutes should elapse before the perfect separation of butter in the churn, during the coldest weather of winter, and that the *quality* of the butter is not debased by the shortness of the time (even if that be from 5 to 12 minutes) consumed in the hottest period of summer, provided the heat be kept down to 60 degrees, I proceed to cite a few lines from the "Book of the Farm," on the subject of churning:

"I have made," says Mr. Stephens, "several experiments with a table churn, in churning cream at different temperatures and with different velocities, but never obtained good butter in less than 30 minutes; and when formed so quickly as in 15

minutes the butter was soft and frothy. I have heard it alleged that butter of the finest quality cannot be obtained from sweet cream; but I know from experience that butter of the richest quality, flavour, and appearance, *can* be made from sweet cream. It has been found that 55 degrees Fahrenheit is the temperature at which the greatest quantity of the finest butter can be obtained, and this is easily attained in a cool apartment early of a summer's morning. The churning should be done slowly at first, until the cream has been completely broken to a uniform mass, when it becomes thinner, and the churning is felt to be easier. After this the motion may be a little increased, and continued until a change is heard in the sound within, and an unequal resistance is felt to be given to the agitators; the butter may then be expected to form soon after this, and the moment it becomes firm, and impedes the agitators, the motion should cease."

The butter should be directly taken from the churn, put into a flat trough slanting in an inclined position, and kneaded by clean hands (not washed with soap), pressed and rolled several times, plenty of pure cold water being applied, till every particle of the butter-milk is expelled; and washing must not cease so long as a shade of milkiness can be discerned. The butter is then to be patted and moulded into any approved form.

Some persons object to washing with water. They say that a thorough kneading, with a very little of the purest salt, so as entirely to press out the slightest trace of fluid, is the safer mode of proceeding. Experience must decide; but in hot weather the coldest spring water must assuredly tend to confer firmness of texture, and it cannot impart any injurious qualities.

A few words remain to be said to those especially who keep but one cow. It generally happens that a cow does not yield milk longer than during nine or ten months of the year. Yet there are many exceptions, and this my own experience has proved; for, in the Isle of Thanet I had a cow which—after calving within 12 hours of her coming to me—failed to breed again; her milk remained good and abundant for a very long period; and, to my own great loss and detriment, I was persuaded to fat her on oil-cake for the butcher. I could never replace this cow. Mr. Stephens adduces a variety of these anomalous instances; one in which a cow belonging to Mr. Ball, near Hampstead, continued to yield milk for seven years subsequent to her first and only calf. If (I can assert) a barren cow prove a good and steady milker, she is invaluable; and a wise economist will be very unwilling to change a certainty for an animal which, under ordinary conditions, must involve a great deal of trouble and anxiety.

THE COMPOSITION OF LAND-DRAINAGE WATER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The composition of the surplus water which in various proportions drains away from all soils, is a question of very considerable interest to the landholder. It involves not only several great collateral objects of examination, but the result of an analysis of such water points out in many instances courses of practical inquiry as to the plants best adapted to the soil, and the elevation of the land most conducive to their prosperity, as well as the mineral or more permanent fertilizers which it will be found advantageous or useless to apply to the soil. In the course of such an inquiry it will almost invariably be found that the water which filters from a calcareous soil abounds with the carbonate of lime, with a portion of sulphate of lime; and that such waters are known to the housekeeper as the *hard* waters for domestic purposes. On the soils from which these waters drain, or which they are wont to cover during floods, the farmer notices the superior growth of sainfoin or lucerne, and one or two other grasses whose ashes abound with the carbonate or sulphate of lime. Such soils he finds little benefited by marling or chalking, and only to

a limited extent by top-dressings with gypsum (sulphate of lime). In examining the water flowing from siliceous sand, however, or gravels, a different series of phenomena commonly present themselves. The water in such places generally contains but a small portion of carbonate of lime; they do not present the bright sparkling appearance of the waters of the chalk or other calcareous districts; they are the *soft* waters of every-day life. The lands from which those waters flow do not commonly produce good crops of sainfoin or the other grasses to which I have alluded; the red clover plant, too, languishes there; the rye grass, abounding as it does in siliceous matters is unwillingly preferred by the farmers of these lands as an artificial grass. The use of calcareous fertilizers on such soils is found very beneficial: they supply a deficiency which the cultivator feels the effects of, without always being aware of the cause. The effect of such additions to the soil naturally alters the composition of the land or drainage-water (since all such waters are merely rain-water filtered through the soil) which is pretty certain to dissolve the soluble substances which it

meets with in the earth. We should not, perhaps, be prepared to expect that the change in the composition of such waters was so rapid, and so considerable as it is even by the application of two or three hundred weights of guano or gypsum per acre. I have on one or two occasions in Essex had an opportunity of noticing the effect produced upon the water of a well, by a small dressing of gypsum applied to the adjoining pasture, its *softness* being very materially diminished, an effect, too, which continued for several months afterwards. In some experiments of Mr. J. Wilson, the present excellent Principal of the college of Cirencester, the drainage water of a field was examined both before and after the application of a top-dressing of the soil with guano (*Farmer's Almanac* vol. iii., p. 247). These trials were made in East Lothian in 1845, the water draining from the soil of a winter fallow was found by him to contain, when examined firstly on the 29th of April (18 gallons held then 15.2 grains of solid matter), just before being dressed with guano and sown with barley, and secondly on the 16th of May (when 18 gallons held 27.5 grains), the water in both cases being obtained from the same drains, the result of the comparative analysis was as follows :—

April 29. May 16.

Organic matter and water.....	3.4	7.8
Silica	0.9	0.7
Silicate of alumina.....	0.4	0.2
Chloride of magnesium.....	1.12	—
Common salt	1.8	2.61
Carbonate of lime	—	2.7
Chloride of calcium	3.0	2.1
Sulphate of alumina	0.85	—
Peroxide of iron	2.1	2.25
Magnesia.....	—	1.69
Phosphate of lime	0.3	3.1
Phosphate of magnesia	—	1.8
Phosphate of alumina.....	—	0.45
	13.87	25.41

The turbid portion of the drainage water first discharged from the soil, after heavy rains, being examined by Mr. Wilson, was not found to differ materially from the drained soil; it held, however, less silica and more lime, the matter deposited by the turbid water containing per cent.

Silica	60.0
Silicate of alumina.....	17.5
Protoxide of iron	6.5
Sulphate of lime	9.4
Sulphate of magnesia	0.75
Phosphate of lime	0.6
Alumina.....	4.0
Water, &c.....	1.25

These waters were both what would be called very *soft* water by the housekeeper, the amount of the

carbonate of lime being in one case very small (only 2.7 grains in 18 gallons), and in the other its amount was not definable. The difference in this respect of waters from even adjacent sources of supply is very noticeable: it is a fact in every respect worthy of the serious consideration of the owners of lands which it is intended to convert into water meads. To give an instance: There is a reservoir on the common at Southampton, into which is gathered the drainage waters of the surrounding land. This surface-water contains only about 3.2 grains of chalk per imperial gallon. Close by the reservoir a shaft has been sunk to a siderable depth down to the chalk. The water obtained from this contains 18.4 grains per imperial gallon. (*Ranger's Report on the Sanitary state of Southampton*, p. 98). In my own neighbourhood in Surrey, the difference between the water from different sources is equally remarkable: that which flows from a spring at nearly the highest portion of the parish of Sydenham contains only about two grains of the salts of lime; that of the Thames, furnished to the parish by the Lambeth Water Works Company, holds more than ten grains, and that of some of the water draining from the London Basin clay nearly three times this amount. At Croydon the same dissimilarity in the composition of the waters exist. That of the River Wandle containing about 16 grains of calcareous salts per gallon, that of some of the adjacent land springs varying from 17½ to 48 grains per gallon.

The composition of surface-drainage water is naturally affected by the amount of the rain which falls on the land. Now this amount is not only affected very considerably by the latitude of the place, but by its elevation above the level of the sea; truths which, however applicable by the farmer, as aiding him in the choice of his rotations, are but seldom sufficiently regarded. This difference has not, in the south of England, been accurately determined by careful observations. In the north the rain-registers kept by Mr. J. F. Miller, in the lake district of Cumberland and Westmoreland, have shown some remarkable and little anticipated results. He observes, in his valuable yet cautiously drawn report (*Trans. Roy. Soc.*, 1849, p. 85), that it would be premature, from the limited data already obtained, to draw any decided inference as to the gradation in the quantity of rain, at these great elevations above the sea. But it seems probable, that, in mountainous districts, the amount of rain increases from the valley upwards, to an altitude of about 2,000 feet, where it reaches a maximum, and that above this elevation it rapidly decreases. The observations made during the summer of 1846, and the year 1847, during every variety of season, confirm the above deductions in every essential par-

ticular; so that we may fairly assume the combined results to be indicative of a physical law, so far, at least, as relates to the particular locality in question, which it is observable is a most remarkably wet district.

In twenty-one months the valley, 160 feet above the sea, received of rain a depth, in inches, equal to

Stye Head	1290 feet,	185·74
Sea-tollar common	1334	180·23
Sparkling Tarn	1900	207·91
Great Gable	2925	136·98
Sea Fell	3166	128·15

Mr. Miller notices an apparent exception to this law, in the case of the rain gauge stationed at Brant Rigg, about midway between the top of Stye Head and the Vale of Wastdale, at an estimated height of 500 feet above the sea, and which, in 1847, received

about one-eighth less rain than the valley. This is the only one of the gauges situated on the *slope* of a mountain; it is on the windward side, and I imagine that, in such a position, eddies or counter-currents are produced in windy weather, which cause a less quantity of water to be deposited in the instrument than is due to the elevation. We know, indeed, that all sloping roofs, from the same cause, materially diminish the receipts of rain gauges. These observations may tempt some of my numerous country readers to examine, with easily constructed rain gauges, some of the meteorological questions, to which I have been alluding in this paper; and if they *are* thus led to examine into a few of the phenomena of nature, which are exhibited around them, it is almost certain that they will be rewarded by solid replies to the questions which they thus ask—answers on which they may safely rely, on many important and practical occasions.

LIQUID MANURE.

Connected with the question of the employment of fresh or partly decomposed farm-yard manure, is that of fermentation or non-fermentation of urine and liquid drainage. It by no means follows, however, that the reasonings on the two are perfectly analogous. It may either be that farm-yard manure requires a degree of fermentation which will not apply to the urine, or that the latter may require a further process of decomposition not needed by the former. For though farm-yard manure may and does contain a considerable portion of urine, yet it is usually believed by those who are advocates of fermentation, that it is rather useful for the breaking-down of the woody fibre of the straw, than for any peculiar decomposition of the juices with which the manure is saturated. Nay, more; the washings and evaporation may be said most certainly to tend rather to waste and evaporate, than to be much advantaged by the operations necessary to promote fermentation in the manure. Mr. Davy, in his prize essay before alluded to, says on this matter, having more apparent reference to the mixture of urine with rain water, but certainly embracing the question of fermentation—"We have the authority of the great German chemist, Sprengel, that the ammonia contained in putrefied urine is increased by being previously mixed with rain water; and we know the fertilising powers of farm-yard manure depend in a great measure on the quantity of ammonia it contains." After giving Sprengel's well-known table of urine analyzed at the different stages, he goes on to say, "By the above analysis, Sprengel

found that 100,000 parts of urine contained, when fresh, 205 parts of ammonia; after becoming putrid the ammonia was increased to 487 parts; but when fresh-mixed with its own bulk of water, and then allowed to become putrid, it contained 1,622 parts of ammonia, or between seven and eight times the quantity it did when fresh." On this the editor of the Transactions of the Yorkshire Agricultural Society has some qualifying observations. Alluding to the same table he says, "The principal part of the ammonia, in the instance before us, is derived from the decomposition of a substance called 'urea,' of which it will be observed there were 4,000 parts in 100,000 parts of fresh urine. Urea is a substance which decomposes with great rapidity under the ordinary circumstances requisite for all decompositions, viz., moisture and a temperature above freezing. In examining the second analysis before us, we find that 4,000 parts of urea, which were shown by the first analysis to exist in this sample of urine when fresh, have been reduced to 1,000; but the ammonia only exceeds that in the first experiment by 282 parts. What then has become of the ammonia resulting from the decomposition of the 3,000 parts of urea, amounting to 1,700 parts? There is no difficulty in answering this question. Ammonia is so volatile a substance, that there is great difficulty in retaining it at all, except in closely covered vessels. Again, in the third analysis the urea is still further reduced to 600 parts; so that 3,400 parts have been decomposed out of 4,000, which ought to have shown an excess

of 1,926 parts of ammonia above that contained in the first analysis or 205, whereas the analysis shows only 1,622 parts in all; so that there has been a loss of 509 parts by volatilization." The editor then goes on in his comment to show that this process of decomposition and waste would go on until the whole of the urea was decomposed, and nearly the whole of the ammonia dissipated by volatilization, and then appears to advise the application of urine in a fresh state, on account, as we apprehend, of the loss of ammonia which its putridity must necessarily occasion. And if the urea can be taken up by the plants with as much facility as we know the ammonia can; nay, if it can be taken up as such, and decomposed in their systems, as some parties hint it is possible for them to be, we can see no reason for any danger of waste being permitted. If, on the other hand, the urea must be decomposed, the more free the ammonia is, the better it is, as a pabulum for the plants. Then, as we said of the farm-yard manure itself, it may be allowable to have a little waste for the sake of obtaining what remains, in that state most favourable for the use of the plants.

It is quite impossible that any one can have a higher opinion of another than we have of the judgment, scientific research, and general ability and acquaintance with practical as well as scientific facts, possessed by the editor of these Transactions, and therefore we may be allowed to express a doubt whether the cases he has adduced in favour of the non-fermentation of urine, are such as bear strongly on the point. He says, "A strong confirmation of this view is afforded by the excellent effects arising from

the folding of sheep upon the land, where the whole of the urine is absorbed in a fresh state." But there are so many other circumstances—as the exudations from the fleece—the manure—the evolution of carbonic acid from the lungs—and, above all, the peculiar kneading of the soil, that it is difficult to say what specific effect the urine has on the soil. Guano, and its rapidity as a fertilizer, containing its ammonia in a state of urate or oxlate of ammonia, we think hardly proves the point, for urate of ammonia is not precisely the same thing as urea itself separated from the other constituents of the urine, as it must become when poured fresh upon the soil.

But, further, we think the admission that in Belgium practice has decided in favour of well-decomposed urine is a very important part of the question; and though, as the writer intimates, its object there, is to force on a crop with the greatest possible rapidity, as in the case of stubble, turnips, carrots, &c., still we are persuaded that nine crops out of ten are all the better for a vigorous development in their early stages.

That the ready-formed ammonia is more immediately efficacious for the growing crops is not, we think, denied; and therefore if steps are taken to prevent the *excessive fermentation* of the urine, no fear need be apprehended, but every advantage may be expected from an incipient fermentation. As fermentation cannot go on without a fresh supply of air, an air-tight and well-trapped tank and drains will just admit sufficient for incipient, and not too much for excessive, fermentation.—Gardeners' and Farmers' Journal.

NETHEREXE FARMERS' CLUB.—NEW PRINCIPLE OF DRAINAGE.

The Rev. R. A. Roberts, of Kentisbeare, who has already published a pamphlet on "The Science of Underground Field Drainage," delivered a lecture before the members of this club, at the Ruffwell Inn, on Wednesday, the 12th ult., Mr. R. May in the chair. The attendance was numerous.

The Lecturer commenced by expressing his sense of the honour done him by being permitted to be present at that special meeting; and he thanked the members for the additional compliment paid him by allowing him to occupy their time upon a subject which as yet was but little known or understood. Whether he should succeed in imparting to them a conviction of the correctness of his views remained to be seen. The principle which he contended for was this, that a power was exercised at

the orifice of drains, and that power led to the extraction of water. There were many branches of science to be brought to bear upon the question: the law of gravitation and the law of attraction were amongst them—the laws that governed the motions of bodies which had substance, and those which had no substance. The surfaces were drained by the agency of power and heat, which, acting on the orifices of the drains, produced what he should call suction: not that that word was the proper one, but he used it as one with which they were most familiar. The question was put to him, "Do you mean to say that you can draw water up the side of a steep hill?" Yes he could, and had done so: he placed a zinc pipe 35 feet long between two common pipes, and the experiment

proved that double the quantity of water was carried away by the zinc pipe over the other two. This was accounted for by the fact that a greater quantity of heat was generated by the metal pipe than by the earthen ones. He would explain the mode of proceeding on the part of the water as it falls from the heavens, and the treatment it received, if he might so express himself, when it came in contact with the ground. There was a stratum and substratum of soil,—clay resisted water as much as it could,—gravel yielded a most passive obedience, —other soils were acted upon according to their natures; and the interstices were filled up quickly or otherwise in accordance with their temperament or texture of the land; and owing to the resistance below the water rose to a table level on the surface. In speaking of this water, some might call it the water of attraction, but he would speak of it as the water of repletion. He looked to the surface for the table level of the water repletion, and he found a cure for that in its subsidence. This must be effected by the revulsion of elements which compose the space to be acted upon; and this revulsion must be effected above the spot on which the mischief occurs, or it would be a useless undertaking. If they wished to stop it below they must divert it above. A drain was acted upon at the higher and lower orifices: at the higher by the attraction of heat, at the lower by that of air—he might say light. They had an equal pressure along the whole surface of a drain diverting the water to two points of attraction, and when the attracting principle was the element of heat the water became a dissolving body, ran out of the spot which governed the table level of water and the whole surface of land, whether in the higher, middle or lower parts. Gravitation will do the work till they got to the level of the drain, but then they must call in the aid of heat. He now came to speak of what was called absorption, and he must say that he had in vain looked for an explanation of that theory: he had never been able to catch a glimpse of its reality: it was a dirty, slow, sloppy experiment unworthy of those intelligent agriculturists who claimed it as their child.

What was the meaning of absorption: He understood it to be water by gravitation, or some means or other so as to find its way through the joints, cracks, or crevices of the pipes,—or if by none of these it was somehow or other to be drawn into the pipes from the porosity of the material. Now it was a strange thing that Parkes and others who contended for this method of draining should have recommended *glazed* pipes; they found, no doubt, that such pipes would draw better, and thus had come round to the principle which he contended for. The lecturer proceeded to combat what he considered to be the errors of the theory of draining by absorption, and to contend that his idea was the only one which could be adopted for effective draining. Take a simple illustration, that of a flower-pot:—Water placed in the saucer would be attracted upward by the temperature of the soil in the pot being of a higher character than the substance of water in the pan. So far as we could gather from the rev. gentleman, we understand his principle to be, that drains are not only aqueducts or channels for carrying off water, but tunnels or tubes for generating and containing air and heat, and that it is the action of these two elements which will cause the water in the land to find its way to the upper orifice of the drain even in hilly countries.

Mr. Roberts gave the result of one experiment although upon a very small scale. We have not one word to say as to the correctness or otherwise of the principle he laid down, but we must add that it would have been far more satisfactory if he could have favoured his auditory with a detail of experiments upon a variety of soils, and applied under a variety of circumstances: some idea could then have been formed as to the practicability of the scheme, and the cost at which it might be carried into execution. In justice, however, to the lecturer, we must add that he stated his desire to be, to give rise to a controversy upon the subject, and we do not doubt that he will be prepared to support his views by reducing them more extensively to practice.

PAROCHIAL ASSESSMENTS.

Lord Malmesbury has addressed the following letter to the committee of peers now sitting on this subject:—

“Whitehall-gardens, June 3.

“MY LORD,—As a committee of your House is now sitting to consider ‘the laws relating to parochial assessments,’ I trust that the following suggestions, which I venture to present to your Lordship, will not be deemed illtimed or irrelevant.

“I assume that the injustice of assessing all local rates exclusively upon real property is admitted.

“I also assume that the anomaly of our parochial system is acknowledged, its most glaring defects being that the proprietors of close rural parishes can, and do, transfer their poor population to a neighbouring parish, thereby reaping all the advantage of their labour when efficient, without the responsibility of their maintenance when impotent; and that in London the rich western parishes, by their building improvements, are gradually driving the pauper population from their own courts and alleys into the eastern parishes, which, although

possessing less property, must meet the increased charge. Thus the fundamental injustice of the law of assessment is rendered still more unfair in the details of rating.

"To any change in this system a strong opposition may be expected from the powerful and numerous body of persons who are comparatively exempt from local rating, such as capitalists of every kind, pensioners, annuitants, mortgagees, and receivers of fines, &c. They have always met any proposition in Parliament to charge them with an equal share of the local assessments, not by a direct assumption of privilege, but by objecting to the difficulty of reforming the various kinds of ratings, and by arguing that, if these rates were charged upon the consolidated fund, poor consumers would have to bear a new burden, and that the rates exciting no individual or personal interest would increase *ad libitum*. By also mixing up the various local imposts into one category they have a great advantage in a debate, and also throw confusion upon the whole subject in a discussion.

"It appears to me, therefore, that our first step in legislating upon these imposts should be to take the poor-rate separately and *per se*, and that we ought to handle this subject as entirely distinct in its policy and moral obligations from the county, church, and highway-rates.

"The virtue of the law of Elizabeth once admitted, it must be difficult for a man to affirm that any peculiar description of property should by any vested and inherent privilege be exempt from paying its proportionate *quota* to the maintenance of the poor, and if he said so there would be an irresistible argument *ad verecundiam* against him.

"Fully agreeing with the reasons usually set forth against charging the consolidated fund with the poor-rate, I prefer recommending a national tax, and would call it the 'Poor-tax.'

"I propose that it should be assessed and levied on the same principle, and by the same officers, as the present income and property-tax, assisted (if advisable) by the overseers.

"It appears that the average of the poor-rate expended for the last five years in England and Wales amounts to about £5,400,000 per annum, which is as nearly as possible the result of the income and property-tax. The poundage of this tax is 7d.; but, as it does not touch incomes below £150 a-year (which would, of course, be liable to the poor-tax which I recommend), I calculate that about 5d. in the pound would be sufficient to raise the £5,400,000 per annum lately expended on the poor of England and Wales.

"I propose that this poor-tax should be voted for a period not less than ten years, but that the assessments should be taken annually, so as to be adapted to the variability of income.

"From this fund each parish should be allowed the average sum expended by it on the poor during the last five years, which is ascertainable from returns already made to Parliament.

"To meet the probable and just apprehensions that such a plan might induce carelessness in the local management, and increase the rates even more rapidly than under the present law, I propose that, if any parish should exceed this allowance so granted, it should be compelled to make up the difference

by a rate-in-aid, raised as it is now, on the real property of the said parish.

"The commissioners and their assistants would watch the changing circumstances of parishes, so that at the end of the ten years an equitable revision of the necessary allowance may be made.

"It is evident that this revision should not be too frequent (I think not oftener than ten years), because the longer the term the more careful the parish would be not to exceed the fixed allowance.

"Should a parish improve in its circumstances during the period, and not expend the annual sum granted, I propose that the guardians report each year to the commissioners accordingly, and that these should be empowered to employ the surplus in aiding local emigration, regard being first had to the analogous requirements of that parish.

"The present average poundage upon real property is 1s. 10d., or £9 per cent. upon £87,320,507. Under the system which I suggest, personal property (which now pays nothing) would contribute a direct tax of 5d. in the pound (and no more) for ten years. The land would pay 5d. on the rent and 2½d. on the tenants' profits, *i. e.*, 7½d. in the pound, the whole of this being paid by the occupier, as it is now, and a portion of the rate assessed on the rent being deducted from mortgagees, jointures, and annuitants on the estate.

"Under the present system 822 parishes pay below, and 13,498 parishes above 5d. in the pound, so that under mine the ratepayers of the latter would be more or less relieved.

"This plan would alter no present arrangement of staff, and would incur no new expense. It would interest a large class of men of business and intelligence in the expenditure of the parish allowance, about which (from paying little or nothing) they are now careless. It does not shake the present principle asserted by Mr. Cobden, that the land is the best and natural security to the pauper for his maintenance; because, if the personal property of this country gradually diminished, the poundage would increase on what remained, and also upon real property; and, if personal property altogether vanished in England, real property would have to bear the full burden of the poor's tax, and remain, as now, the great and last security of the pauper.

"I believe that the security I propose against lavish expenditure would be more efficient than the present, when we find that poor-rates have increased £1,400,000 in ten years.

"A reform of other rates seems to me a more difficult matter, as they are hampered with the magisterial system. Their increase, in some counties, to triple the sum at which they stood eleven years ago certainly requires reform. I believe, however, that the building and maintenance of the gaols, and lunatic asylums, and the police, should and could be, without any opposition from the public, charged on the consolidated fund, for all men are equally liable to insanity and robbery, and personal property is even more exposed to depredation than real.

"I have the honour to remain,

"Your Lordship's obedient servant,

"MALMESBURY."

ON INCREASING OUR SUPPLIES OF ANIMAL FOOD.

Many, perhaps most sheep and cattle, are fed and fattened on grass alone, or on turnips and other green food, with at best a little hay. In Scotland, where a turnip is a very different thing from that which it is in England, cattle may be, and to some extent are, fattened on turnips and straw. In England, and in Scotland too, however, it is now more generally the custom to use oil-cake and other nutritive food in the process. In Lincolnshire large quantities of this linseed-cake are consumed every winter in the straw-yards: and the farmer is repaid for his outlay in this respect by the production of a large quantity of valuable manure. Of course the value of this manure as a fertilizer depends upon the quality of the food from which it is made, as well as on that of the other products of its consumption; oil-cake, *minus* the growth of a growing animal, which is *its* manure in such a case, is a much better thing than mere straw *minus* the same, which would be the manure of a young animal fed on straw alone. The former contains various nitrogenous and mineral substances useful as food for plants, of which the latter is almost destitute. And so, by the way, is the manure made by a fattening animal better than that made by a growing one feeding on the same food; just, indeed, in the proportion in which the mere extraction of fat, which is nearly all the growth in the one case, would leave a better remainder than the subtraction of flesh and bones from the food, which is the growth, in the other. But this is a digression.

More lately the eyes of farmers have opened to the real composition of the oil-cake, as it is purchased either from home or foreign makers. It is found in many cases to be very much adulterated with all sorts of seeds and rubbish; and, in good measure owing to the exertions of Mr. Warnes, of Trimmingham, in Norfolk, the method has latterly prevailed of giving animals whole linseed (not the mere husk, which is all that oil-cake at its best contains,) and along with it of adding to the straw chaff, in which it is conveyed to the animals, some farinaceous substance, as Indian corn, barley, or bean meal. The question whether it is profitable thus to consume these concentrated sorts of food in feeding stock, depends altogether on the kind of animals that are fed. A sheep or ox which will not waste its food either in growing offal or in tedious growth, will convert that profitably which on an animal of coarser build and less thrifty growth would be thrown away. The latter would

lose more of their food than the advantage of the proportion they managed to assimilate would repay; and thus the only question to determine is, what degree of nutritiveness is it most profitable to confer on the food given? The use of this better food is perfectly economical even with a poor stock, provided it be used only to raise what of the farm produce may be below the standard of quality which this question indicates. With poor stock I have used linseed with profit. A thin linseed soup poured over straw chaff will confer a savoury taste, even though it be so diluted as to leave the food thus prepared of less nutritive strength than the ordinary green food of the farm; and there is, perhaps, no better door open to an increased produce of meat for the country at large than means such as this afford of inducing the larger consumption of what is now trodden under foot. A salt, hot, and weak linseed soup thrown over straw chaff, while conferring its own flavour, brings out that of the straw, which is thus far more readily consumed than the mere addition of oil-cake is likely to make it. This fact is submitted to those who are in the habit of using such large quantities of oil-cake as cattle food. We have kept oxen through winter in a rapidly improving condition* on turnip-tops at the commencement, and half a cwt. of turnips daily a-piece afterwards, along with an *ad lib.* allowance of straw chaff, over which about half a pailful of salt water for each beast, containing 1lb. of linseed meal boiled in it, had been thrown.

Of course a more intensive system of feeding is profitable in the case of well-bred animals. Many instances of this are scattered about in agricultural publications, but they illustrate the possibility rather than prove the truth of our statement. They are not numerous enough nor various enough to show that the average experience of farmers bears us out; but I may specify one or two cases as illustrations, and for the rest appeal to the common impression which *has* arisen, however carelessly, out of experience, to corroborate the assertion that high feeding, by its greater produce of valuable manure, is profitable to the farmer; and in the case of well-

* At a cost of for turnips (at 10s. a ton)... 3d. daily.
 " linseed 1d. " "

4d. a day

Or 2s. 4d. a-week, beside fuel, attendance, and straw.

bred animals, by its greater produce of meat, is profitable even to the feeder. The following is a bit of our own experience during the past winter:—Four good Hereford oxen were bought towards the end of October for £60 at a dear market, and sold again in thirteen weeks at 6d. per lb., for £77. These four oxen in thirteen weeks gained £17 or 26s. per week, or 6s. 6d. per ox per week. They consumed during that time 18 tons of mangold wurzel, 30 bushels of beans, and 4 cwt. of linseed meal, for which, besides the manure, we have thus obtained the following prices:—

	£	s.	d.
4 cwt. linseed, or more than 5lb. daily } per ox, at 11s.	2	4	0
30 bushels beans, or nearly 6lb. daily } per ox, at 4s. 6d.	6	15	0
18 tons mangold wurzel, or 1 cwt. daily } per ox, at 9s.	8	2	0
	£17	1	0

This has paid well: but though one of the oxen was ill for a fortnight, and lost flesh by its illness, I have no hesitation in saying that the result is far beyond the average truth in such matters.

The method of feeding adopted in the case of our four Hereford oxen was the same as we have for the last few years adopted with all our cattle and sheep. Each sheep gets about one-eighth the quantity given to an ox, with about 20lbs. of swedes daily in the beginning of winter, or of mangold wurzel in the spring. The same method is adopted with cattle during summer: they are fed on the linseed compound along with cut clover or vetches *ad lib.* The following is our present arrangement, in which, simply owing to the proportion of the stock of food on hand, our proportion of linseed-meal and bean and other meal varies from it much. Every day 40lbs. of linseed are boiled in 70 gallons of water and thrown over 44 heaped bushel baskets full of chaff, on which again 250lbs. of bean and other meal are dusted. Of this the sheep (200) get 16 baskets, *i.e.* about 15lbs. of linseed and 90lbs. of meal, equal to 1½ oz. of linseed and nearly half-a-pound of meal daily a-piece; and the cattle (30) get 24 baskets, *i.e.* 22lbs. of linseed and 135lbs. of meal, equal to about 12 oz. of linseed and 4½lbs. of meal each daily. The rest is given to horses. I might give other instances of the profit of feeding cattle on purchased food, and of the greater economy of home-made food compared with the oil-cake which is generally used. Mr. Warnes' own published experience has furnished instances; and the following is a case which he quotes:—

Mr. Postle, of Smallborough, Norfolk, tried the merits of oil-cake against those of linseed and peas. He found that six cattle consumed £20 6s. 1½d. in linseed, peas, fuel, and labour, besides the swedes

and hay they received: and that the other six consumed £21 14s. 9d. in linseed cake, besides an equal quantity of grown food and hay. The former lot, though apparently of only equal weight and quality with the latter at the commencement of the experiment, had gained by the close of it, during a period of six months, about 45 stones of beef more than the other. And this advantage on the part of linseed and meal over oil-cake holds good in the case of sheep as well as cattle. Mr. Bruce, of Waughton, in a report communicated to the Highland Society in 1844, gave the result of an experiment on this point, in which lots of twenty sheep each were fed variously and tried against one another for a considerable period, and the increase of each being compared with the food consumed, it was found that to every pound of increased weight in one case, there had been a consumption of 101 oz. of linseed cake; and to every pound of increased weight in another there had been a consumption of 59 oz. of linseed and beans, (mixed 1 to 6); and to every pound of increased weight in a third there had been a consumption of 56½ oz. of linseed and beans (mixed in the proportion of 3 and 2); while, in a fourth instance, the same growth had been effected during the consumption of only 46 oz. of linseed by itself. It appears, therefore, that it is economical to use linseed whole rather than the mere husks of it which we obtain in oil-cake. In all the former cases it was ground to meal and boiled in water enough to make a mucilage, and then thrown over chaff enough to make nearly a bushel of the porridge to every beast, the bran and other meal being first dusted over the whole and incorporated with it. In the last the linseed was given to the sheep whole, and they ate it out of troughs as they ate the oil-cake. Mr. Warnes has latterly recommended the linseed *to be given in a cold mucilage, which can be obtained at less cost by the mere soaking of the meal in cold water for a day and a-half.* One measure of linseed meal is to be placed in seven measures of water stirred up and allowed to stand; it will form a jelly in about 30 hours, and may then be thrown over chaff, and used with other meal just as the hot solution is: cattle, it is said, are found to do as well on the cold as on the warm food. I have no experience to offer on this assertion, but I should doubt it.

And this leads to the question in what condition should food be offered to cattle. Of summer food, vetches, &c., cut and carried to the house, a somewhat costly experience makes us say that it should be cut and left to wither some hours before use. Green and succulent as the vetch or clover is, they are as often physic as they are food, unless somewhat dried before consumption. Of winter food—turnips and mangold wurzel—I have only to say

that they should be used in the order of their ripening : common turnips first, then the hybrids, then swedes, and lastly mangold murzel. They are rarely given boiled. Mr. Warnes has recommended them when cut to be laid in a heap or mashed in a cask along with the hot linseed mucilage which he pours over them, so that the whole is warmed ; but the few existing experiments on the subject, however favourable to the feeding of pigs on boiled food, have not recommended its use to cattle. Mr. Walker of Haddington found five oxen and heifers on steamed turnips, &c., to cost £5 19s. more during the period of the experiment than the same number on food uncooked ; and while the latter, after putting a certain value on the food consumed, paid £4 12s. beyond their cost, the former did not repay their expenses, similarly estimated, by about 16s. on the lot.

And as regards the condition of the artificial food given to cattle, the Harleston Farmers' Club recommends the boiling of the corn even more than of the linseed with which it is mixed. Our practice

has been to boil the linseed merely, and then dust the corn meal over the chaff after the boiling mucilage has been added. And that it is of importance thoroughly to reduce the linseed by grinding, and boil it, and convert it perfectly into a mucilage, is proved by the experiments of Mr. Thompson, of Moat Hall, near York. He found that of 1,000 grains of uncrushed linseed boiled for one hour 845 were still insoluble, while of the same quantity crushed and similarly treated only 525 were insoluble. And notwithstanding that most of our meat-producing animals chew the cud, it is well to be particular in assisting mastication and digestion by the utmost reduction of their food before it is administered. Turnip-cutters and chaff-cutters and corn-crushers are useful in a meat manufactory, not only by causing the consumption of what would otherwise, to a great extent be lost but also by enabling the more perfect exhaustion of the nourishment contained in that which is consumed.—Prize Essay by J. C. Morton, in the Journal of the Royal Agricultural Society of England.

STEAM POWER IN AGRICULTURE.

Some time since, Mr. Mechi delivered a lecture at the Coggeshall Mechanics' Institute, "On the necessity and advantage of applying steam power to Agriculture," before a very numerous audience, amongst whom were a goodly number of farmers, millers, and others, connected with agricultural pursuits. W. P. Honeywood, Esq., presided. The lecturer, who was very cordially greeted, said—I consider it the duty of us all to communicate to each other any little knowledge we may possess upon a particular subject ; and having been requested by the committee of this institution to deliver a lecture, I have chosen the subject of the application of steam to agriculture, because those I address are living in the midst of an agricultural district ; and believing that no man who has been accustomed to travel by steam would like to go back to the old system of fifty miles in six or eight hours, I consider the time is come when the farming body must mend their pace. The spirit of the age is progression, and it would be strange indeed if agriculture should escape the general influence. Steam!—mighty steam! (continued the lecturer). The term suggests a thousand pleasing and profitable reflections. That marvellous and almost invisible power which brooks no opposition, which never tires—scouring the plains, piercing the hills—threading the valleys, and ploughing the wide

ocean—mastering, with indignant ease, time and space, wind, water, and seasons. The varieties of its power may well amaze us—here 'tis wielding the ponderous hammer that gives shape and consistence to gigantic metallic masses—there it weaves the gossamer web, or twists the slender fibre. It plunges the hardy miner deep into the bowels of mother earth, and raises from her lap her mineral and metallic treasures. These glow and flow with liquid meltings at its powerful blast ; here 'tis printing bank notes, there coining golden sovereigns. To-day 'tis preparing food and clothing for the body ; to-morrow it feasts the mind, spreading far and wide, in countless numbers, the broad sheets of intelligence. Instruments of death and of preservation alike acknowledge its power. What a comprehensive word is this said STEAM : it means peace, progression, civilization, education, abundance, and cheapness ; it is the death-blow to monopoly and privation. Ignorance and prejudice shrink away at its approach ; the iron barrier of separation is broken by steam. The interposition of time, of distance, or of poverty, no longer wounds the tender affections. It increases alike our political power as a nation, and our morality ; for the increase of physical comfort must, in a Christian community like blessed England, predispose to moral good. But if this all-pervading power clothes the body with elegance and cheapness, and

stores the mind with knowledge and intelligence, can agriculture alone escape its influence? Impossible! It must and will feed as well as clothe the people cheaply. The landlord or farmer who saves his time and his money by the concentrated power and speed of a hundred horses on the rail, or five hundred on the ocean, must draw comparisons and conclusions adverse and disparaging to our present slow and crawling system of agricultural mechanics. The general application of steam in agriculture involves a thorough change and reformation of our farming system. It is a question of more capital and less land, both for landlord and tenant (Hear, hear); it is a question of abolition of men of straw, and substitution of men of capital—industry, intelligence, and integrity are all capital; it is a question of a compensation for unexhausted improvements, or an ample security of tenure by lease; it is a question of public registration and easy transfer of landed property. It will compel a more acute observance of the laws of mechanics, and will sharpen the intellects of the agricultural labouring community. In a word, the employment of steam power in agriculture will compel or induce a larger employment of labour and production of food. Drainage, deeper cultivation, open fields, good roads, better buildings, more live stock, and less weeds (laughter), must and will be the concomitants of agricultural steam-power; for steam-power means amendment and progression. It would be a curious statistic could we accurately know the number of horses that would be required to produce a power equivalent to that now in action by our fixed, locomotive, or marine steam engines. I apprehend that if the whole surface of England were sown with oats and cropped with grass for hay, there would be not enough to feed the requisite number of horses; but if there were food enough we must have whole towns of stables, streets of harness-makers, and squares of farriers and veterinary surgeons (laughter). The very leather for our shoes would be doubled or trebled in value. Take as an illustration one of our transatlantic steam vessels of one thousand horse power; why, as she ploughs the ocean without intermission by day and by night, it would require at least 4,000 horses to do her work—more likely 6,000—because no horse could labour incessantly and without intermission for six consecutive hours. Just imagine food, water, harness, shoes, grooms, drivers, and stables for four thousand horses! Conceive the possibility of combining and applying their power on one particular object, or of using it on water; fancy the space they would occupy. Any one who has seen 4,000 bullocks on a Monday in Smithfield market may illustrate it. Why they would cover acres of ground, or reach miles in length. The

mere hiring, superintending, lodging, and feeding their necessary attendants would involve a tolerable commissariat. The whole affair would be best represented by a moderate-sized town. Well, then, but for steam the happy inhabitants of merry England could not and would not have those luxuries, comforts, or necessities which they now enjoy. Honour be to that departed philosopher whose sagacity and perception, under Divine Providence, applied the bubbling resistance of our teakettles to the most noble and useful purposes of humanity (applause). After the last illustration, I need hardly say that steam will do on a farm that which horses cannot do. I will now descend to the dry details of first cost and daily expense of my own six-horse power steam-engine, and the uses to which it is applied; this is essentially necessary, in the presence of my practical agricultural friends, because I know too many who have considered or believed that Mr. Mechi was a visionary theorist, or crazy enthusiast in agriculture; but time (aided by a certain number of goodly stacks) is working changes of opinion; and I would advise certain folks to look after their laurels, for the physis of sound theory is beginning to operate at Tiptree Hall Farm (laughter), as the forthcoming crops promise most abundantly to illustrate. Steam has already done something for agriculture. That vast expanse of swamps and bogs, the safe and solitary refuge of the snipe, the duck, and the bittern—I mean the great Bedford level—presents now a dry and rich extent of corn, of roots, and of stock. As the flitting railway train wafts us through this line of country, the peering shafts of powerful pumping engines indicate the cause of this great change. At a recent inaugurative trial of a new 40 horse power pumping engine, I see it stated that it raised 120 tons of water per minute! There is no doubt but ultimately we shall avail ourselves of steam for irrigation, in our warm and dry districts, for summer green crops. Ultimately the power of steam will be applied to the working and stirring of the soil; already many experimental trials have taken place. One thing is quite certain, that the general application of steam power in cultivation will necessitate such a squaring and levelling and re-parcelling of the soil as will thoroughly reform the hedge-and-ditch-row-ism and topography of this kingdom (laughter). It will equally compel a reformation and re-adjustment of the system of transfer or exchange of land, which should change hands as easily as the three per cent. consols. A farm of 600 acres should represent a square mile with a farmery in its centre, having half a mile diverging roads to its extremities; whereas now, under the system of old custom and unalterability, a farm of that size generally involves the intricate threading

of miles of almost impassable green and muddy lanes, with fields of every form except the right one (laughter).

In another century it will scarcely be credited that in this great agricultural county, of one million acres, there could not be found half a dozen agricultural steam engines! indeed, it is only recently that steam power is being gradually applied to our county corn mills; so that if we depended on meal for our stock they would alike be subjected to starvation by a long calm, a heavy flood, or a dry summer (Hear). The absence of engines implies a scarcity of engineers, which has been a sad drawback; fortunately now for this neighbourhood two able working young men (Messrs. Striffler and Algar) have located at Kelvedon. To me their services have been truly valuable on various emergencies, and I can speak highly of their practical engineering intelligence and acquirements. In fact, they have passed the ordeal of a metropolitan experience in marine and other engines. They assure me they are able to supply high pressure engines, with boiler and fixing and brickwork complete, at £25 per horse power. Their first attempt appears to me most simple and useful. If they succeed, great will be the advantage to our neighbourhood. You must remember that a steam engine is like a gigantic watch; every part must work together smoothly and harmoniously. The amazing velocity, power, and pressure of steam tries to the utmost every screw, bolt, joint, cog, or strap. You must, therefore, allow for "the miseries of a steam engine" as well as its comforts and advantages; above all things, the good going of your engine will, like the watch, depend not only on the skill and integrity of the original maker, but also on the ability of those who repair it when out of order. Some idea of the intricacy of a steam engine may be formed from the fact that there are more than five thousand separate pieces in a railway locomotive, the failure of any one of which pieces might endanger or obstruct its proper action. I am enabled to form a correct comparative estimate of the relative power of horses and steam, because, unfortunately, my first attempt was with six real horses; the remembrance of that great mistake awakens many unpleasant and unprofitable reflections (laughter). The mere working space required for the six horses is three times as great as that necessary for the engine and boiler—to say nothing of the stalls, attendance, and food. Horses, when not at work, must be fed and attended to, even on Sundays; whereas a steam-engine may be rested days or weeks without cost or injury. If a steam-horse costs only £25, it is quite clear that it is in first cost, power, maintenance, and durability, more advantageous than a real horse; besides, if you

feed it well with coals and water, you may work it all night as well as all day.

	£	s.	d.
First cost and outlay of my own six-horse power engine, best wrought boiler	150	0	0
Fixing shaft, brickwork, &c.	70	0	0
Pair of mill stones, gearing, and miller's tools	50	0	0
Turner and Hurwood's linseed crusher and gearing	15	0	0
Pump and gearing	15	0	0
Sack tackle and gearing	10	0	0
Threshing machine and gearing, shutters, &c.	50	0	0
Dressing-machine and gear	20	0	0
Chaff-cutter and gearing	20	0	0
Grindstone and gearing	10	0	0
	£410	0	0

I believe Messrs. Striffler and Algar would undertake the whole for a much smaller sum; but of course the cost must vary in some degree with the buildings.

DAILY CHARGE.

	£	s.	d.
Coals ($\frac{1}{2}$ a ton)	0	10	0
Miller and engine-driver both combined in one man	0	3	4
Sperm oil, rags, candles, packing, &c.	0	0	6
Wear and repairs to engine, &c.	0	1	6
	0	15	4
Interest of capital, £410, at 5 per cent.	0	1	4
	0	16	8
Daily profit	0	11	4
	£1	8	0

The cinder ashes from the engine are given to the pigs, and they eat them with great relish and advantage (laughter).

DAILY WORK DONE.

Charged at the price we should have to pay in the regular way, independent of cartage to mill, &c.—

	£	s.	d.
Seven quarters of corn ground	1	1	0
130 bushels of chaff cut 1-8th of an inch long (less woman's time 7d.) ..	0	3	6
Miller's toll saved, 4 lbs. per sack, is 56 at $\frac{3}{4}$ d. (laughter)	0	3	6
Linseed crushed, water pumped, sacks raised, grindstone turned, water boiled, food steamed			gratis.
	£1	8	0

For a small additional cost I could drive an extra pair of mill stones. My agreement with my miller is to work later if required. So that we could, if necessary, do much more at a trifling increase of fuel. The daily charge for fuel depends on a variety of circumstances, such as the price of coals and the quantity of work done in a given time; mine of 6-horse power driven with great rapidity

(about 92 revolutions per minute) consumes in the ten working hours nearly half a ton of coals. They are the large Blyth coals, which cost me, including cartage to the farm, 18s. 6d. per ton. The quantity of work done by this engine is much more than ten horses could possibly accomplish.

COST OF A DAY'S THRESHING.

	£	s.	d.
30 qrs. of long mowed wheat, threshed, dressed, and sacked up in eight hours, or 40 qrs. of reaped wheat; coals, 10s.; engine driver, 3s. 4d.; oil rags, &c., 6d.; wear and repairs to engine, 1s. 6d.; interest on capital, 1s. 4d...	0	16	8
Wages of seven men at 1s. 6d.	0	10	6
Three women and three boys at 8d. each	0	4	0
	£1	11	2

or 1s. per quarter for the mowed and 9d. per quarter for the reaped wheat; more might be done, but thirty quarters of mowed wheat is as much as a good man can pass through his hands in the time. (Hear, hear). But even if, instead of 11s. 4d. daily gain we only conducted our business at the ordinary cost, still there would be an immense convenience in being able to do everything our own way and at the right time, without cartage to mill and the uncertainties of supply. Steam will have the effect of abolishing or diminishing the extent of land in grass. Some farmers would stare with disbelief if you told them that it was easy to keep working horses in good order without hay; but I can assure them it is quite possible to do so, provided we allow them a sufficiency of meal with their cut straw chaff, and add a little linseed soup to it. The same remark applies to feeding cattle. The facility of cutting straw into chaff and grinding corn into meal by steam power will convince landlords and tenants too that the poor grass lands will be more advantageous converted into good corn and root growing arable land. The Scotch system of two years grass for rest will naturally give way to the improved method of obtaining abundant manure by purchased corn on boarded floors or under sheds. My daily consumption of chaff is more than 130 bushels. If, by any mischance or repair, the engine is not at work for a few days, great is the outcry for its use. Everything seems out of joint without it. But on what sized farms can steam be advantageously used? Here I am sure I shall differ most widely from the majority of landlords and of tenants of the present day. Before I answer the question I should ask what amount of live stock per acre do you mean to keep? If you determine to keep, as I do, £4 to £5 worth of live stock per acre, you will require a steam engine on a farm of 130 to 200 acres varying in power from four to six horse. Mine of six-horse power finds

ample employment on a farm of 170 acres. In fact, as I extend my accommodation I shall increase my quantity of live stock, being convinced that on this depends the increased fertility of our soils. It may be said, if everybody did as you do, meat would be very cheap. I can honestly tell you there is no fear of everybody doing so, prejudice or want of capital, both by landlords and tenants, will be an effectual bar to its general and immediate extension; but the sooner we begin the better, for it is quite clear that even in this well cultivated county, we are a desperate long way from perfection. (Hear, hear). The system of selling off corn and cattle from the land without bringing back an equivalent in feeding stuffs or artificial manures, will not stand the test of abundance and cheapness. This impoverishing system is alike fatal to the land and he who farms it. It has been urged that the employment of steam power displaces manual labour. However specious this objection may appear it is not founded in fact, because the same principle of profit and economy that would induce an agriculturist to employ steam would also cause him to drain and subsoil his land, open his ditches, square his fields, trim his fences, mend his roads, burn earth, cart chalk, keep his land free from weeds, and do many things that tend to the increased employment of labour. Besides, the making of a steam-engine is nearly all labour, except the mere iron ore obtained by labour.

Thousands of labourers are rendered permanent and premature paupers by the slavery of agriculture—I mean threshing and chaff-cutting. These operations are generally paid for by the piece or task work. The result is over exertion, a short cough, asthma, pain in the side, or some permanent disability. I see too many instances of this kind. Steam power would prevent them. The use of hand threshing machines is cruelty indeed, and most unprofitable. In conclusion, I recommend the use of steam in agriculture on the principle of humanity; as improving, by the cheapening and increase of food, the physical, moral, and social condition of the working classes—on the score of economy and profit, individual, parochial, and general—on the ground of providing food and employment for our mechanical engineers and miners, rather than for our horses; and last, not least, as the basis for promoting the honour and safety of the nation by increasing the number of hardy tars to navigate our coal laden vessels; or, if need be, to man and defend "Old England's wooden walls." (Applause). Mr. Mechi concluded by observing that he should be happy to hear and answer any questions, on any point that might be discussed upon the use of his system.

Mr. F. U. PATTISSON.—How many horses do

you consider necessary to be used upon a farm containing 170 acres?

Mr. MECHI.—The number I have employed in working upon the farm, irrespective of those engaged in the carting of chalk, is eight horses, but we think we can do with six.

Mr. PATTISSON.—Then what do you consider to be your saving in horse power?

Mr. MECHI.—It saves two horses on the farm.

Mr. PATTISSON.—But eight horses will do for a farm of 200 acres.

Mr. MECHI.—But no part of my land is grass; the whole of it is subsoiled, and I require and use more horse labour than many of my neighbours do upon their farms; in fact, I subsoil it once in every four years.

Mr. GILES.—How many horses do you keep now less than you were in the habit of keeping before you had the steam-engine?

Mr. MECHI.—We reckon that we save two horses upon the farm; but I am very much in love with deep cultivation, as being a great improvement to land that is drained; and wherever we have so cultivated the soil we have derived very great advantages from it. But I have made a charge for all that is done in one whole day, so that I do not see that it interferes so much with horse power on the farm.

Mr. PATTISSON.—I think, if you do not lessen the horse power by the use of the steam engine upon your farm there can be no great gain or advantage in the use of it. But for milling, grinding, thrashing, and so on it may be advantageous, and not else.

Mr. MECHI.—Your horses cannot be thrashing and doing other work at the same time, and the employing of horses in thrashing out corn wears them out so much. I could thrash out the produce of my own farm in fourteen days, and my produce is perhaps larger than that of most other farms of the same size, for I grow 340 quarters of wheat—or take it in round numbers at 300 quarters—84 of barley, and beans besides.

Mr. PATTISSON.—But we can thrash beans at one shilling per quarter.

Mr. MECHI.—We can do it on the terms already named, but we could not do so much on the farm without the steam engine. We use five or six quarters of meal per day, and 13 bushels of chaff, and they use the steam engine for thrashing and chaff cutting only. On farms of 300 acres in Scotland they invariably employ the steam engine; but the cost for thrashing by a hand machine would be 3s. per quarter. I never knew a person who had a steam engine but he found some employment for it, and it stimulated to improvement.

Hear, hear). [Mr. Mechi here read a letter from

Messrs. Stiffler and Algar, giving the opinions of those gentlemen on the steam engine.] If Mr. Pattisson were going to London he would prefer being drawn by a steam engine, and those engines were of 70 or 90 horse power. He was happy to speak to the chairman, and say, that when a man invested £500 in the purchase of a steam engine and the other buildings that might be wanted, he must invest more capital in the soil, and the tenant should have every encouragement and security given to him; and this engine, he had no doubt, would make the farm produce more profit and grow more corn. For if you put the corn into the land again after it has passed through the animals it must make the succeeding crop better. But he thought the cow farmers, with their making of butter and rearing of calves, had done more harm to land than enough.

Mr. HALL enquired, in the event of a steam engine and other things not answering upon a farm, whether the landlords would be compelled to take these new-fangled improvements off their hands.

Mr. MECHI.—I am sorry, Mr Hall, to hear you say "new-fangled improvements." (Laughter).

Mr. Hall.—But if landlords would grant leases, then there would be more security for the tenant in improving his farm.

Mr. MECHI.—I am quite sure that such a man as our worthy chairman, and many others would never part with a respectable tenant; but speaking as a general rule we should take the advantage of obtaining a lease whenever it was to be given. The law, however, should impose some security for the tenant, and we must invest more capital in the soil, or take less land—(hear, hear.)—we must increase the quantity of food grown upon that farm, and also increase the other advantages of the farm by the application of science and steam power. In the manufacturing districts the markets could not be met without the application of steam power, for no man in his senses would go back to horse power in the manufacturing districts. Such a course would be looked upon as madness; one thing is quite certain, viz., that any man would think me mad to attempt to do by horse power, that which I can now do by the aid of steam. (Hear, hear).

Mr. PIPER asked what quantity of corn per day could be ground by Mr. Mechi's steam engine.

Mr. MECHI replied that the quantity of corn ground, must, of course, depend upon the number of revolutions made by the engines in a minute; for upon them would depend the quantity of flour produced. His own engine made 90 revolutions per minute. He was afraid of Mr. Piper. (Laughter).

Mr. PIPER.—You think, because I can beat you

in farming that I can beat you in milling also. (Laughter).

Mr. MECCHI.—The cost of grinding is about a shilling a quarter, and we can grind about seven quarters of barley per day with a stone of 4ft. 4in. In reply to a question asked by a gentleman as to whether his steam engine had ever ground 14 sacks of corn in 10 hours, he could say that it had done so.

Mr. STIFFLER here rose, and said that he must add his testimony, in one respect, to the statements which had been already made by Mr. Mechi, for he had seen one sack of meal ground by his engine in 20 minutes. (Hear, hear). He was sure that was the truth, and that rate of grinding was kept up for six sacks consecutively. With respect to the quantity of 15 sacks per day of 10 hours being ground on a 3ft. stone, he felt, in some measure, quite able to corroborate Mr. Mechi's statement. Such was the case, whether some gentlemen felt inclined to believe the statement or not, and he believed that even more than the quantity he had mentioned could be got off the peak stone if barley were ground upon it. In conclusion, he could only repeat that what had been stated as to the quantity ground was a fact. (Hear, hear).

Mr. MECCHI.—In 10 hours one engine will grind 30 sacks.

Mr. STIFFLER.—A stone of 2 ft. 10 in. would do it; and one person had said that he had seen ten sacks off a 2 ft. 10 in. stone, where the revolutions had been 240 to 245 in one minute.

Mr. MECCHI.—As to the durability of an engine, the question was mooted some time since in Suffolk, where a man said that he had an engine of 12 horse power that had been in use for 12 years, and that at the expiration of that time she was as good as on the first day that he drove her [Hear, hear].

Mr. HALL said that he had had an engine of 10 horse power in use for twenty years, and it was a second-hand one when he bought it [Laughter].

Mr. MECCHI said he did think that their millering friends would ultimately avail themselves of the advantages of steam, and he hoped they would work for the public cheaper than they did at present. He believed that his own engine was worked two days out of three.

Mr. SWINBORNE (gelatine manufacturer) referred to Mr. Mechi's estimate of 1s. 6d. a-day for repairs, observing that exceeded his experience of the matter: for though his engine had broken down three times, it had not cost him such a sum as that. He should be very sorry to return to the use of horse power.

Mr. MECCHI said, that on his farm they had 200 pigs, 25 bullocks, and 140 sheep to feed every day, and the horses were all kept in doors.

Mr. PATTISSON.—Ladies and gentlemen: I have been requested to move a resolution, and will do so with the greatest pleasure. It is to propose a vote of thanks to Mr. Mechi, in coming forward to enlighten us on the present occasion. With regard to steam power, which Mr. Mechi has described in his lecture as meaning "amendment and progression," and I am a decided friend to both, I have yet to learn the great advantages of its being applied to a farm of 200 acres, without Mr. Mechi can show me that it lessens horse power; and at present I think he has failed in the attempt, although I thought he would have shown that it was of great advantage to agriculture. As to the question of grinding corn by steam, it does not appear to me that the saving by so doing is so great as to make it desirable either for a farmer or a landlord to go to an expense of £500 or £600 in providing premises for such a purpose, and I should feel some reluctance in doing so, unless I saw more advantages to be derived from it than have been pointed out at present. I shall be glad to look over Mr. Mechi's premises. I never meet him without a smile, and he has no hesitation in showing his premises to the public, or in giving them a general invitation, and in treating them with kindness when they visit him. I think, therefore, it is for us to treat him in the same way, when he comes amongst us; I have therefore great pleasure in proposing the resolution [Cheers].

Mr. SADLER seconded the resolution. Mr. Mechi had, he said, delighted them very much that evening, and he felt great interest in the advancement of the pursuits of agriculture.

Mr. GILES moved "That this meeting is of opinion that it is desirable that agriculturists should turn their attention to the subject of using steam upon their farms."

The CHAIRMAN.—I feel great pleasure in putting to the meeting the resolution, proposing a vote of thanks to Mr. Mechi, for the kind manner in which he has come forward on the present occasion. Whether we agree with him, or whether we do not agree with him, is a matter of opinion; but we can all acknowledge with gratitude the way in which he has come forward to instruct the agricultural community as well as he can [Hear, hear]. You may either adopt his views or reject them, as you like: but I know it has been the fashion among narrow-minded men—[Hear, hear]—to try and cry him down; and I will say, that to tenant farmers he has done great good throughout this community. He is himself a practical man, and whenever he has come forward, he has benefited those whom he has come amongst that are bad farmers, and I hope those that are good ones also. I think, then, we are under a deep debt of gratitude to him,

and much in his debt for his kind conduct on this occasion [Loud cheers].

Mr. MECHI.—I hope I feel and duly appreciate the kind and friendly manner in which you have acknowledged my services of this night, and hope I shall be found, as a public man, an advocate for the benefit of my fellow creatures. I think that when it is advantageous for countries, or nations, or cities, to come forward, it is also beneficial to have an interchange of individual experiments and sentiments, and the more we discuss in a friendly tone certain things, the more will it tend to elicit the truth. [Hear, hear]. I have often been asked to shew a profit upon my experiments, and on this occasion I have shewn you that I gain 11s. 8d. per day by the use of the steam-engine. But at the same time I must tell you that I have taken the minimum profit, and I will grind 15 quarters of corn, or three sacks, in ten hours. As to the displacing of horse-power, my system has taken two horses off my farm, and has therefore liberated two horses for other purposes. With regard to the subsoil that is my look-out, but I shall be happy to see all who will come to my farm, and if I can instruct my

millering friends I shall be most happy to do so [Cheers].

Mr. GILES again moved "That this subject is well worthy the attention of agriculturists;" but the motion was not seconded.

Mr. PATTISSON then moved a vote of thanks to the chairman, which was duly seconded, and carried with cheers.

The CHAIRMAN said, if his services had been of any value, the meeting were exceedingly welcome to them. It had been a great satisfaction to him to hear Mr. Mechi, and he hoped that gentleman would come amongst them again, for he was an honour to the county of Essex, and had done all in his power to stimulate the cause of agriculture. Even one gentleman present had now admitted that he wanted steam, whereas the same gentleman was only just previously opposed to it. In conclusion, he would be happy to come amongst them at all times when he could assist in the promotion of that high, moral, and social feeling which they had that evening the pleasure of enjoying. The chairman sat down loudly cheered, and the discussion ended.

HIGH FARMING IN AYRSHIRE.

LIQUID MANURE DISTRIBUTED BY STEAM.

It has long been a subject of complaint that farmers as a class are slow to take advantage of those benefits which the scientific knowledge and mechanical ingenuity of the age hold forth to them. It is otherwise with manufacturers. If the chemist discovers a method by which cloth may be better or more cheaply dyed, or the mechanist contrives a machine that will simplify any process of its manufacture, the improvements are instantly brought into general use. The manufacturer is necessitated to act on the best principles in all the departments of his business, or he would soon be jostled from the market. His art has thus been brought to the highest efficiency of which it is capable with our present knowledge. Why should not agriculture profit in an equal degree from the advances in science and art, for which the present time is so famous? Can they not be brought to bear with equal success in farming as on the other productive arts? The cultivators of the soil are beginning to look for assistance in this direction—and when once in the right path it is wonderful how much British enterprise can effect. They will learn from the chemist the constituent elements of the soil, of manures, of growing plants, and living animals, and the relation which each bears to the others. This knowledge, confirmed by observation and in-

duction, will lead to the establishment upon correct principles of the art of producing beef and grain; and the mechanical arts will afford the means of lessening the cost of this production by the contrivance of the best machines for in-door work, and implements for turning over and comminuting the soil, and in particular by the substitution of steam power for manual and horse labour in every department in which it is possible to apply it economically on the farm. There are as yet only a very few steam-engines on farms in Ayrshire; but will any of the parties who use them incline to give them up? Nay, verily. Once on the homestead, and the giant, powerful as he is, is harnessed by degrees to so many purposes as to tax his utmost strength. By-and-bye engine-stalks will be almost as common on first-class farms as on factories.

We seldom reflect how much the progress, which from time to time is made in the arts, is owing to the original views and the exertions of a very few individuals. A large proportion of men can do their work well according to a system which they have been taught, or have seen followed by others; but comparatively few have boldness and originality enough to strike out a new path for themselves. How much, for instance, has the farming of the present day been indebted to the talent and zeal of

Mr. Smith, of Deanston? His sagacious mind led the way to correct views of thorough draining, and the impulse which he gave to this improvement—the indispensable precursor of all other progress in the art of farming—is showing itself more clearly year after year, as a national boon, the importance of which cannot be easily over-estimated. Besides Mr. Smith, there are a few earnest and indefatigable men advancing by great strides. There is Mr. Mechi, of Tiptree Hall—a clear-headed man, and not easily baffled by obstacles. He purchased a farm in Essex seven or eight years ago, and set about its improvement with vigour. Undeterred by the clamours of shallow-drainers, he went to the average depth of four feet on the most tenacious clays—draining the whole farm in this manner. He removed useless hedge-rows, cultivated deep, manured liberally, and erected an extensive range of buildings, with a steam-engine for the manufacture of his crops. Mr. Mechi may not as yet have made himself much richer by his agricultural efforts, but he has made many a man think that previously took his grandfather as a rule. Then again, there is Mr. Huxtable, the amiable rector of Sutton Waldron, in Dorsetshire, whose searching spirit is so well fitted for philosophic investigation. He was the first, we believe, who introduced the system into this country of house-feeding in summer as well as winter—by which more cattle can be kept on a given extent of land. And he has paid great attention to the saving and economical application of farm manure. He advocated the erection of sheds over manure heaps, when the idea was novel to farmers; and the correctness of his views is now pretty generally recognised by intelligent men. The liquid manure he collects into tanks, and by means of a force-pump, worked by steam, sends it through clay pipes to the fields. We might allude likewise to the efforts that are made on Earl Ducie's example farm in Gloucestershire, and Mr. Pusey's in Berkshire; but as these are the property and in the possession of great landed proprietors, they are not likely so much to interest many practical men, who look narrowly to the balance-sheet as the rigid test of success in any experiments. To come nearer home, we have Mr. Harvey, the extensive cow-feeder at Port-Dundas, who pumps up by steam the liquid of his byres to a sufficient height to run it through clay-pipes to the fields, by the force of gravitation—raising by this means crops of remarkable luxuriance. And there is Mr. M'Culloch, whose system at Auchness is so well known by the publication of Mr. Caird's pamphlet, and by the controversy which has followed.

Whatever there is most worthy of commendation in the plans of these active pioneers of agricultural progress has been adopted, and in many instances

surpassed, by the works at Myremill. We had the pleasure of inspecting them a few days since, and, like all visitors, were much gratified. The new buildings are superior to those on Auchness, and the tanks, the pipes, and the mode of distributing the liquid manure, excel those of Mr. Huxtable. The works are not yet completed; but even as they are, we have no hesitation in saying that they are not equalled on any farm in the kingdom.

For the information of the distant reader, we may mention that the lands of Myremill are situated in the parish of Maybole, about nine miles from Ayr. The occupation of the tenant, Mr. James Kennedy, extends to 560 Scotch, or 700 imperial acres of arable land. It comprises the farms of Myremill, High Culzean, Stoneyfield, Laigh Culzean, and Blairbowie. With the exception of the two last-named farms, these lands are the property of P. W. Kennedy, Esq., of Drummellan. The whole has been drained, and latterly a considerable portion of it, where the shallow system had been practised, has been re-drained four feet deep. This is now Mr. Kennedy's minimum depth. The soil is various. Where Myremill houses are situated it is naturally thin, and resting on a tenacious till. There is little level land on the farm. What is level is partly improved moss, and the remainder rich alluvial soil. The largest proportion is of medium tenacity, and has been well cultivated for a considerable length of time.

The buildings of Myremill are situated on an elevated, though not the highest, part of the farm. The old steading was tolerably suited to the green crop system as commonly followed; but was far from being sufficiently commodious for the soiling system and other improvements which the proprietor and tenant, about a year and a-half since, mutually agreed to carry out. An additional extensive range of buildings has accordingly been erected. The first of these to which we were conducted was the *forage* house. It is 66 feet in length, by 22 in width. Turnips and other food for present use are stored here, and there are two wide carriage entrances to it. It is floored with tiles. The hay-cutter and turnip-washer and cutter are placed in it, and are connected with the steam engine at the other side of the court by an underground shaft. The hay-cutter is by Mr. John Cornice, Barbridge, and cost £14, exclusive of the gearing. A patent was taken for it in 1847, and prizes have been given to the inventor at every agricultural exhibition at which it has been shewn. A person to feed does all the manual labour required, and the hay is cut into pieces of about an inch in length in a very expeditious manner. We were much pleased with the turnip-washer and cutter, the former of which is of American invention,

but in the present instance has been much improved by our ingenious townsman Mr. John Young, to whom indeed the credit is due of having executed all the engineering parts of the Myremill improvements. The washer externally has the appearance of a revolving cylinder hung at a considerable inclination. The inside fitting is that of a screw, and there is plenty of water run into it from a pipe. The turnips are thrown in at an opening in the upper end of the cylinder it twos or threes at regular intervals; but the individual at work is kept busily employed. The turning of the cylinder causes them to revolve round the axis in the spiral convolutions until they reach the other end, when at the same regular intervals—once for each revolution of the cylinder—they are thrown out washed, and are then carried up by elevators on a gutta percha belt to the cutter which finishes the work. One person to throw in the turnips, and one to shovel them out from below the cutter, will, with the aid of these mechanical contrivances, prepare a day's turnips for 200 cattle in less than an hour and a-half. We regard the washing of turnips as of great importance with the heavy soil and soft climate of Ayrshire. By these contrivances it is easily effected; indeed it would require the same number of hands to attend to the cutter alone without washing. The turnip wagons are altogether of metal. They have four wheels with moveable axles like that of a carriage in front, so as to turn easily. The cutters with gearing, &c., are so constructed that they can be removed during summer when they are not required, and the house is used for the green food.

The two new byres run at right angles from the side of the forage-house. Their width is just equal to its length. In each of the byres, fifty-two cattle are placed in two rows, with a centre passage—six feet wide, and a passage at each side before their heads—4½ feet in width. There are three doors from the forage-house to each byre, corresponding to the passages, and one at the other end from the centre passage, opening to the manure heap. The passages and the stalls where the cattle stand are paved with tiles laid with mortar upon sand, the same as the floor of the forage-house. It forms quite a smooth walk for running the feeding wagons upon. Under each of the bullocks the tiles are laid in a slightly concave form, and the lowest of these in the centre is perforated with holes, through which the liquid of the animal is drained to the pipe underneath, which communicates with the tank. Tunnels, three feet square, for the admission of air, are constructed under each of the four walks in front of the cattle. There are gratings outside to admit currents of air at both ends, with boards to regulate the admission of the air. There are also

air gratings over the tunnels opposite each stall of cattle. The impure air escapes by ventilation in the roof. There is a substantial stone trough before each animal, with an opening from the one to the other, about six inches from the bottom. By connecting the troughs at the upper end of the byres with the water pipe, by means of gutta percha hose, the whole of the troughs are filled to that depth without more trouble. The plentiful supply of water in the pipes admits, likewise, of the drains which carry off the liquid manure to the tanks being flushed three or four times a-week, or more frequently, if it be thought necessary, so that there is no danger of their choking. On entering these byres, one feels agreeably surprised alike by their extent, and their clean, tidy appearance. They are each 94 feet in length, by 33 feet in width, and 11 feet in height. They are lathed and plastered over; and the camlsided roofs, with rows of ventilating skylight windows at each side, give them quite an airy appearance. The two byres are stalled for the accommodation of 104 cattle, and as filled at present, from the clean and quiet state of the animals, have all the appearance of comfort and rapid improvement. The largest stalls are seven feet and ten inches, by seven and a-half feet, and they are gradually made less, so as to be suitable for different sizes of cattle.

The plan of box-feeding is carried on in two other houses, which contain nearly forty head of cattle. This method is coming much into repute among the best feeders in England. It is natural to suppose that cattle will be more contented when they have a little liberty to move about and choose their beds, than when tied up in a stall, and kept continuously on one spot; and it is well known that there is an intimate connection between a contented state of the animal, and a rapid improvement in its condition. More food, however, will be required when they are allowed to take a little exercise; but this, we believe, is compensated by the fattening process being accelerated in a corresponding degree. It has been frequently urged that box-fed cattle must, of necessity, be kept in a filthy state. The inspection of the boxes at Myremill convinced us of the groundlessness of this objection, as the cattle contained in them were as sleek and clean in the skin as those in the stalls. To our view, the chief objections to the system are, that it requires a greater extent of housing, and more litter, and the work of feeding is not so convenient; and as the liquid, instead of running to the tank, is completely absorbed by the litter, it causes a greater amount of cartage, and gives less work for the steam-engine. Mr. Kennedy's boxes, which are constructed for the accommodation of two cattle each, are thirteen by ten feet. It will thus be seen

that a building which is large enough for twenty cattle in boxes, would contain thirty in wooden stalls. And it is asserted by Mr. Huxtable, with appearance of reason, that straw, though it contains but a small proportion of nutritious matter, may be used to better purpose than by being trodden down for manure. By cutting it for mixing with cooked food in winter, and the quickly-grown succulent grasses in summer, its mere bulk is of advantage for filling the capacious stomach of the ox, and causing him to ruminate more; and it is at the same time useful from its slightly astringent effect on the bowels, which are apt to be over-laxative from the free use of turnips or Italian rye-grass. Taking all these considerations into account, we think that the system of stall-feeding should be preferred in all plans for the building or remodelling of steadings.

There is accommodation altogether for one hundred and fifty fattening cattle at Myremill, and Mr. Kennedy can put up eighty more at his out-farms. He has sold three-hundred fat since harvest, and bought others in their stead. And the cattle are brought into a condition in which they realize the highest market price. To those who feel an interest in such matters it certainly is no ordinary treat to see these large buildings filled with fine cattle in a thriving condition, and all the operations connected with them going on like clock-work. There are few places we presume where such an extensive and well conducted manufactory of beef can be seen.

The cooking-house for the cattle is floored with tiles as already described. On one side of it are arranged four large boilers, in which linseed is cooked by condensed steam from the engine. About half an hour suffices for this. As soon as it is prepared it is thrown in a hot state over cut hay, chaff, bean-meal, and bruised oats, or whatever is used for mixing at the time. The whole is allowed to lie on the floor, according to the plan of Mr. Warnes, until the dry chaff or hay absorbs the mucilaginous matter of the linseed. The ordinary feeding at present used is, for each fattening animal about 50lbs. of cut turnips at five A.M. At eleven o'clock, 15 to 16lbs. of the cooked food, followed by a little dry hay. At five P.M., another 50lbs. of cut turnip and hay or straw, after which the cattle are littered up for the night.

The granary is over the forage-house, with a flight of steps outside. It is well lighted and aired, and also, we are happy to say, well filled, notwithstanding its great extent.

Immediately connected with the engine is a machine for bruising corn and linseed. It was constructed by Mr. John Young, and it does him much credit, as we have not anywhere seen this

description of work more efficiently performed. In the same building there is also a circular saw for cutting wood for farm purposes.

The entire drainage of the steading is carried in the first instance to a small cesspool, where any sediment it contains settles to the bottom, and the liquid flows into a tank at hand. The tank is 48 feet long, 14 wide, and 15 deep. The second tank is of the same length and width, and is 11 feet deep. The tanks are formed by digging out the earth, building the sides without puddling, as the stiff subsoil does not require it, and arching over the top. The two are capable of containing upwards of 100,000 gallons. The liquid manure is pumped by the engine from the first to the second tank, where it is diluted with water according to its strength and the state of the weather, and is made ready for being discharged upon the fields. It is obvious that a steady supply of water is required for this and the various other purposes about the steading. Such has been obtained by bringing it in pipes from a higher level, at a distance less than a mile.

Cast-iron pipes have already been laid down for conveying the liquid from the tanks to 350 Scotch acres of land. There are stop-cocks in the centres of the fields, generally for each ten acres of land. To these, when a particular field is to be manured, gutta percha pipes are attached in lengths of about 30 feet, and a hose at the end for discharging the liquid over the field. The operation is begun at the centre by describing a circle round the cock, which circle is gradually widened by adding to the gutta percha till the whole field is taken in. Before gutta percha came into use, a few years ago, such a plan could not have been adopted. It is the only substance known which combines the essential requisites of strength and flexibility. When we saw the process in full play on Friday, the jet from the hose was discharged to a distance of 120 feet, and the steam-engine, which is of 12 horse power, was working a powerful thrashing machine at the same time. It fell like a heavy shower over the ground, saturating it in an even manner. A man to direct the jet, so as to attain an equal distribution of the manure, and a boy to assist in moving the pipes, are all that are required on the field. In this manner the steam-engine and force-pump will manure ten acres of land in a day, throwing on from 8 to 10 tons per acre. There is no danger of the pipes suffering from too high pressure, though an obstruction should occur to prevent the efflux of the liquid. A strong cast-iron apparatus of a globular form, connected with the pipes, and air-tight outside, is placed near the engine. When the pipes are full, and the engine still at work, the liquid is forced towards the globe, and when the pressure comes up to a certain degree of force, the com-

pressed air acts on the safety-valve of the engine, and the liquid, no longer impelled, runs back along a conduit into the tank. It is principally in the distribution of the manure that Mr. Kennedy is so far in advance of Mr. Huxtable. The plan at Sutton Waldron is that of cisterns, two hundred yards apart, from which the liquid is carried in buckets to be thrown by men over the land. Mr. Huxtable should come to see the magnificent jet on the Myremill fields: it would give him some idea of the æsthetics of farming.

When the engine, the pumps, and the pipes are thus in complete order, it is evidently of great importance to make them do as much work as possible. An attempt is to be made at Myrehill to dissolve a large proportion of the solid manure, and force it through the pipes, and thus effect a great saving of manual and horse labour. The bullocks which are so well provided with a clean dry bed, will receive as little litter as possible, and the manure which is thus made, almost free from straw, will be conveyed to a large tank and dissolved with water, or, at least, brought to such a degree of thinness as, it is expected, will admit of its being pumped out. A large additional tank is laid off for this purpose, alongside of another new one for liquid. The two will be capacious enough to hold 200,000 gallons. If this plan succeed, and we can see no formidable objection to it, it will cause a great saving at that busy season—the time of turnip-sowing. Besides this, what is to prevent Mr. Kennedy from watering a field at sowing time, and thus, by a day's work of the engine, he may obtain a turnip braird in a droughty season over ten acres of land, and increase the crop by fifty, or it may be an hundred, tons? It is altogether a great advance in the way of high and economic cultivation.

We can scarcely indicate the course of cropping which is likely to be adopted at Myremill. The system points to an extensive growth of the succulent grasses and roots, for which our island climate is so suitable. A great number of cattle may thus, at all seasons, be fed, rich manure made, and the land brought to a garden-like state of fertility. As yet, Mr. Kennedy is but feeling his way; but, from the result of trials already made, he will be induced to sow annually a considerable breadth of Italian ryegrass. A field of ten Scotch acres, which produced a turnip crop in 1848, was sown with Dickenson's Italian ryegrass in April, 1849. Towards the end of May, when the grass had come up, it was dressed with guano. It will be recollected that the month of May last was very cold and backward, and it was near the beginning of July before the first of it was ready to cut. During the next three months the field, by cutting and soiling, afforded

feeding to eighty fattening cattle and twenty horses. In addition to the grass, the horses had two feeds of oats, and the cattle four pounds of oilcake daily. The whole of the field was cut three times, and a part of it four times. The land from which each day's grass was taken was manured with liquid in the afternoon, as at Sutton Waldron and Auchness. This year the same field will yield a good cut by the end of April, and the manuring can be kept up more efficiently now that the pipes are laid down. As an evidence of the good feeding qualities of the grass, it may be mentioned that twenty of the cattle which were purchased at Ardrossan tryst last year and fed on it, gave fifty shillings a head of profit for six weeks' keep. At the time when the cattle were accustomed to it they would not eat red clover.

We observe that tram plates are in course of being laid on the farm-roads at Myremill. This will conduce in no slight degree to a saving of labour where of necessity so much carting must go on at all seasons. In addition to the permanent rails, a stock will be kept on hand, which at any time can be extended into a field from which there may be much cartage in a wet season, in order both to save the land from being cut up, and to facilitate the work. The system will not be allowed to fail from a want of completeness in any of the principal conditions of its success.

The reader may wish to have an idea of the cost of re-modelling and extending the steading and the other works in connection with the scheme. This is of essential importance in forming an estimate of the plan, as its merits must be ultimately tested by the question of profit. We are not prepared to enter minutely into figures, but may state generally that the cost of the pipes is from thirty to forty shillings for each Scotch acre within their range; and the entire expenditure on houses, tanks, engine, pumps, pipes, rails, &c. is not much more than would suffice to thorough drain the land. Such an outlay should not discourage any liberal landlords who may have thoughts of making a similar experiment; and it would be very much for the interests of agriculture that a number of others should be made in different parts of the country, as people in general, are most satisfied with results of which they have been personally cognizant. After seeing the extent and excellence of the works at Myremill, we were a little surprised on learning that the expenditure was not much greater than it really is. But there is less difference than might at first be supposed between completing such works in the best style, and constructing them in a less efficient manner. The best, though it should be the highest priced, article is usually the cheapest ultimately, and it is much the same with houses and other per-

manent erections. The byres, for instance, which we have described, and the plan of which we would recommend for adoption wherever fattening or dairy stocks are kept, cost very little more than common erections for cattle throughout the country. The usual calculation for slate-roofed byres on extensive estates in this neighbourhood is £5 for each head of cattle which they have space to accommodate. Those at Myremill cost £6 per head; and when we consider the benefits to be derived from good lighting and thorough ventilation, the facility of labour by the smooth, wide, durable walks, and the comforts of dryness and cleanness to the animals, the advantages joined appear to us much more than commensurate with the additional outlay.

When instances of high farming are promulgated, there has been a tendency of late to view them through a political medium. This is to be regretted, in so far as it prevents people from considering the subject dispassionately: but even this feeling has given rise to a more widely spread spirit of inquiry, and in this respect will be productive of good. The advocates of progress may be assailed and brow-beat on all hands, but there is little danger that the onward tendency of the age will receive any serious check from the evanescent bitterness of politics. We trust that the Myremill scheme will be estimated simply by its merits. There is no occasion for concealing that it has been hastened by what both the proprietor and tenant conceived to be the urgent necessity of active efforts being made to meet a probably low scale of prices in future years. There could surely not be a more laudable motive. But the plan is not pressed upon the farming com-

munity as a substitute for anything whatever. Those who approve may imitate; and if there be others who at first sight may doubt the prudence of such extensive alterations, we would recommend to them at least carefully to inspect the operations, and to await the results before pronouncing an adverse judgment. It is a question which experience and not criticism must solve, whether by such means food may be produced more abundantly and cheaply than by previous methods of management.

We are sure that our readers will join with us in heartily wishing that success may crown the great experiment of which we have endeavoured to give a slight outline. To many, the project would at first have a visionary appearance; but the plan has been carefully studied as a whole, and the details thoughtfully worked out; and it was in the hands of men who were not to be deterred by the grand objection which would have deterred thousands—that it was an untried scheme. In very few cases, indeed, could such an attempt be made. It would require, as in the present instance, a far-seeing and generous landlord, with adequate pecuniary means, faith in the unerring laws of nature, and the correct interpretation of them by men in advance of their compeers; and, in addition, confidence in the intelligence, the integrity, and the sound judgment of his tenant. The friends of progress, everywhere, are under a debt of gratitude to Mr. Kennedy of Drumellan for the magnificent example he is giving of what science and art can do for the advancement of agriculture.—Ayr Advertiser.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

LETTER V.

BERKELEY, GLOUCESTERSHIRE,
FEBRUARY, 1850.

Having in our last communication described the present state of farming on the Cotswold-hills, we propose now to place before the public in as concise a form as possible the actual condition of agriculture in the Vale of Gloucester. This beautiful vale extends in a south-westerly direction from Tewkesbury, on the borders of Worcestershire, to Thornbury, in the western division of the county. It is almost entirely a pastoral district—grass lands succeeding each other in uninterrupted succession, and the operations of the plough seldom disturbing

the green livery of nature. Of course the soil varies in quality, and where stiff wet clay is found it is inferior, but, on the whole, the vale of Gloucester presents unmistakeable evidence of great fertility. It has a densely wooded aspect, caused by the extraordinary profusion of hedges and hedge-row timber, which, subdividing, hemming in, and girding round the pasture ground in every variety of form, overshadow its surface, suck up its fertilizing properties, and substitute for regular field boundaries a maze of straggling fences, where everything like arrangement and economy in the distribution of the soil is entirely lost sight of. Some conception of the extent to which the vale is encumbered with wood may be formed from the

fact that in clearing for cultivation Earl Ducie's model farm at Whitfield, £3,500 worth of hedge-row timber was obtained from a space of 260 acres. It is satisfactory to think that should it be determined to reduce the number of fences which at present cover this district, the value of the wood will greatly reduce the costliness of the operation. The immense hedge-rows, and the extraordinary multiplication of them over the face of the country, are ascribed to a number of causes, of which the small extent of farms, and the consequent increase of the classes dependent on the soil for their support, probably are the chief. It appears, too, that in this district the inhabitants used formerly to resort to their hedges for fuel, and to obviate this, a very stringent condition has been introduced into the agreements between landlord and tenant, binding the latter not to prune his hedges oftener than once in seven years. The consequence of this has been that the hedges, growing to an immense size, have become a shelter for game, and as that shelter affords great facilities for depredations on the farmer's crop, the evil consequences to him are of the most serious character. The dairy farmers of the vale have but a small portion of their land under tillage, and the very scantiness of this renders the destruction caused by game more complete, and more severely felt by them. Of course on estates like that of Earl Fitzhardinge, where the preservation of game is made a primary matter, the hardship is greater than where this is less attended to—but generally throughout the Vale of Gloucester the size and the number of hedge-rows, the quantity of hedge-row and field-timber, and the amount of cover thus provided, are conspicuous evils. The number of hedges stereotypes as it were a certain form of agriculture in the land, preventing, by inconvenient subdivisions of the soil the choice between different systems of cultivation, and the introduction of any of the various plans by which, in modern times, labour is economized and the cost of production reduced. The size of the hedges is a palpable evil, detracting from those fertilizing properties which should go to nourish vegetation, besides uselessly occupying a very considerable space. As to trees growing in the hedge-rows and fields, they are obviously injurious to the farmer, and benefit the landlord at his expense. On the Whitfield farm there were 1,200 trees, or about 5 to each acre; and, taking that as an index of the proportion over the vale, it follows that the landlord, having let the land at its full value to the tenant, is, nevertheless, growing upon it an immense quantity of timber, which sucks up its natural resources, absorbs part of the farmer's manure, and yields him no benefit whatever in return.

The whole of this subject naturally leads us to

consider the relations usually found existing between landlord and tenant in the Vale of Gloucester. The character of these relations will, we think, be best understood by such illustrations as conspicuous cases furnish; and as Earl Ducie and Earl Fitzhardinge are, perhaps, the two proprietors in the vale with whose names the public are most familiar, we select them as examples. Earl Ducie is a great agriculturist: he farms extensively himself, and in the most approved style. He some years ago, at very considerable expense, formed the well-known model farm of Whitfield, and, having held it himself for some time, he has let it to Mr. Morton, who enjoys a high reputation as an agriculturist. Earl Ducie is not a severe landlord, nor has he neglected some of the means at least for enlarging the views of his tenantry, and teaching them the most improved systems of cultivation. Earl Fitzhardinge is not an agriculturist; he is a great preserver of game, an encourager of field sports rather than of field labour. He treats his tenants without much consideration, and such is the system that the farmer who wishes to be safe in his holding must stand well with the gamekeeper. In these two cases dissimilar results might be expected. The tenantry of Earl Ducie, it might be thought, would exhibit a marked progress in the practice of agriculture, while those of Earl Fitzhardinge would be vastly inferior to them. But what is the actual state of matters? The tenantry of both proprietors are much upon a level as skilful farmers, adopting as nearly as possible the system which prevailed in the country thirty years ago. This anomaly we leave to others to explain, contenting ourselves with the general observation, that where, under proprietors presenting so strong a contrast to each other, the state of farming is the same, the relations existing between landlord and tenant cannot be in a satisfactory state. The rent of land in the Vale of Gloucester is generally 30s. an acre, or, including rates and tithe, about £2 an acre. The best quality of land, however, lets, inclusive of the local burdens, at 50s. an acre. The tenants almost invariably hold their farms from year to year. No deductions of rent have yet been made by the landlords to any extent, and it is said that in consequence many are preparing to throw up their lands.

The dairy farming of the Vale of Gloucester might be described with perfect accuracy by an extract from the "County Report to the Board of Agriculture," made nearly forty years ago. Taken as a whole, it has undergone no change in its details, though very possibly the increased luxuriance of the hedge-rows, and the continual abstraction of cheese and butter without any corresponding return of phosphates to the land, may have led to a perceptible decrease in its annual produce. Water

stagnates in the soil, the industry of the farmer is paralysed, the energy of the labourer deadened, and nothing seems to thrive but the gigantic trees, whose roots in the smaller fields cover nearly their whole substratum like a network. A brief outline of the appearance of a Gloucestershire dairy-farm may serve to show the present state of the art in that district. January is not the month most favourable for viewing the operations of a dairy, but the care and management of the dairy herd at this season are of much influence on the yield afterwards. An inconvenient road conducted us to the entrance gate of a dilapidated farmyard, one side of which was occupied by a huge barn and waggon-shed, and the other by the farmhouse, dairy, and piggeries. The farm-yard was divided by a wall, and two lots of milch cows were accommodated in the separate divisions. On one side of the first division was a temporary shed, covered with bushes and straw. Beneath this shed there was a comparatively dry lair for the stock; the yard itself was wet, dirty, and uncomfortable. The other yard was exactly the counterpart of this, only that it wanted even the aid of the shelter shed. In these two yards are confined the dairy stock of the farm during the winter months; they are supplied with hay in antique square hay-racks, ingeniously capped over to protect the hay with a thatched roof, very much resembling Robinson Crusoe's hat. In each yard two of these are placed, round which the shivering animals station themselves as soon as the feeder gives them their diurnal ration, and there they patiently browse the scanty contents. A dripping rain was falling as we looked at them, from which their heads were sheltered by the thatched roof of the hay-rack, only, however, to have it poured in a heavier stream on their necks and shoulders. Passing into the other yard, the cows had finished their provender, and showed their dissatisfaction with its meagre character by butting each other round the rack. The largest and greediest having finished her own share, immediately dislodges her neighbour, while she in her turn repeats the blow on the next; and so the chase begins, the cows digging their horns into each other's sides, and discontentedly pursuing one another through the wet and miry yard. Getting over an inner gate, we came upon the piggeries, where a dozen well-fed and warmly housed pigs showed by their sleek round sides the benefits of food and shelter. Inquiring of the farmer whether he thought his cows would not be bettered by equally comfortable accommodation, he said they would, but his landlord did not give that accommodation, and he had no security by which at his own cost he could safely make the outlay. Leaving the yard, we passed into the fields, sinking at every step in the sour wet grass lands. Here little heaps of dung, the exhausted relics of the hay from which the cows derive their only support in winter, were being scattered thinly over the ground, to aid in the production of another crop of hay. But we need not continue the picture farther. The management of the dairy itself did not come under our observation, as nothing is done in it at this season; but it is said to be conducted with great care, cleanliness, and attention.

It is well known that much benefit has attended the application of bones as manure to dairy farms in Cheshire and other counties, and this benefit is accounted for by the annual abstraction of phosphates in the cheese sold off the farm. We did not hear that bones were used to any extent in this district. The advantages of drainage seem to be very little appreciated, the great bulk of the dairy farms of the county, even those which most require it being inadequately drained. Some instances were pointed out to us where this operation had been executed with great advantage, and which showed how much might be done by a liberal outlay for this object. In these cases the landlord supplied the tiles, and the tenant was at the expense of opening the drains. No winter food, except hay, is provided for the stock, roots being deemed injurious to them. Under this management, even in the famed Vale of Gloucester, we were not surprised to learn that the annual produce of a dairy cow, on the average, does not exceed 3½cwt. of cheese, and that fully three acres of land are required for the annual support of each cow.

Can no improvement be made on this system? We know there can. Let the land be thoroughly drained, so that the manure the farmer puts on it may not be wasted; let the too numerous trees and hedge-rows be removed, which at present rob the pastures, and whose roots, if the trees are left, would penetrate and obstruct the drains; let the farmer have suitable accommodation provided in which he may economically feed and shelter his stock; and then encourage him by security of tenure to increase the productiveness of his farm. From the half of the land formerly devoted to hay the same quantity will be got by the application of purchased manures; the other half will then produce him cabbages, kohlrabi, and mangold wurzel, which may be given to his stock in winter without injuriously affecting the taste of the milk. He will thus be enabled to continue his sales of butter at the time when it is scarcest and sells best. Manure of a richer quality, and in greatly additional quantity, will be accumulated, its application will improve the productiveness of the well-drained land, and both the annual produce of each animal will be more valuable, and the number which the land supports will also be materially increased. Every one will be benefited by the change; the landlord, in the increased capital invested by the tenant, will have better security for the regular payment of his rent; the tenant, in the increased produce, will have a better return for his capital; and the labourer, in increased employment, a better market for his labour.

The fall in the value of Gloucester dairy produce has been very considerable; a cow, which yielded cheese and butter worth £9 last year, producing not more than £6 10s. this year to the farmer. As he has nothing else to recompense him, and cannot, without the co-operation of his landlord, adopt any system by which to increase his produce, he must, of necessity, suffer severely from the fall in prices. He employs very little labour, and that paid for at a low rate. There is not, therefore, any mode of managing land in which rent forms a more important item in the cost of production than

in dairy farming. The wages paid to labourers in the vale have fallen 1s. since last year, 7s. and 8s. being now the average weekly wages of a man; 6s. is sometimes paid; but, as we were significantly informed, 6s. worth of work in such cases only is given.

Many of the dairy farms of the vale have a small portion of tillage land attached to their farms. This is commonly cultivated in a three-field course, viz., fallow or roots, beans, wheat; or a "four-field," viz., fallow or roots, barley, beans or clover, wheat. The average crops of wheat vary from 24 to 28 bushels; barley, 40 bushels; and beans, 20 to 30.

It is worthy of remark that the farmers on the Cotswolds seemed to be a superior class of men to those holding land in the vale. Their farms are larger, and they are men of greater capital; but it appears somewhat anomalous that the better soil, with the better climate, and paying the higher rent, and the higher rate of wages, should be held by the less intelligent class of men, and under the more backward mode of management, while the worse soil, with a cold climate and a low rent, is possessed by men of intelligence and energy, and cultivated with considerable skill. The small size of the vale farms places them within the reach of a greater number of competitors than the large arable holdings on the Cotswolds, and they accordingly bring a higher relative rent, while the convertible character of the hill lands calls forth a greater exercise of skill than the monotonous routine of an old-fashioned dairy farm. It may be mentioned that in both districts model farms have been established—that of Whitfield in the vale, and the College-farm of Cirencester on the wolds. Whitfield example-farm has exercised a beneficial influence on the national agriculture, and though it does not admit of being copied literally in its own neighbourhood, on account of the dairy character of the district and the numerous obstacles to arable farming, yet there can be no doubt that by degrees many hints will be taken by the surrounding farmers, whose prejudices will yield to the satisfactory evidence of success.

Before closing our notice of Gloucestershire, we shall, as usual, state the opinions most prevalent among the farmers themselves as to the best mode of remedying their present distress. If prices continue permanently low, the dairy farmers look to a reduction of rent as their only remedy. All parties seem to think that rents have been run up too high by over competition, and that the landlord must either, by expending capital in improvements, give his tenant a better article for his money, or content himself with less rent for the article he gives. Repayment for unexhausted improvements was strongly urged as the foundation of a better system of husbandry, in which the tenant was said to have as much right to be secured by Act of Parliament as the landlord has in the possession of his land. The effect of this was expected to limit the competition for farms by the necessity it imposes of a larger capital on the part of the entering tenant, while it would encourage a liberal expenditure by the man of capital, and thus, in a great measure, supersede the want of means on the part

of the landlord himself, or his want of interest in consequence of possessing, as in many cases, only a life interest in his estate. The effect of this increased investment of tenants' capital in cultivation, amounting probably to not less than two years' rent, would, it was thought, afford as much security to the landlord for the payment of his rent as if the same sum had been previously lodged in his hands.

EXETER, FEB. 5.

The county of Devon presents, in an agricultural point of view, such an interesting variety of features, that, were we to enter into a complete description of each, a greater portion of our time would be occupied than we can spare for this part of England. Moreover, as our inquiry has a more direct bearing on the districts most exposed to the pressure arising from the low price of corn, we feel that there is the less necessity for giving more than a brief outline of what we have seen and heard here. The resources of the soil, the advantages of the climate, and the mixed character of the cultivation, all combine to render farming here a less hopeless undertaking than some people appear to imagine it has generally become, and we therefore propose to compress the results of our inquiries in this county within the limits of one communication.

The surface of Devonshire is for the most part of a very unequal and undulating character, the land opening up into a succession of small valleys clothed with verdure, and within the sheltered recesses of which ample opportunities are afforded for careful and successful farming. Yet the rich luxuriance of the soil and the soft and pleasing varieties of the general scenery are not always maintained, nor even in Devonshire is the climate always mild. In many places the land is of a less kindly nature. The green valleys become less frequent, and in their stead we have great moorland wastes placed at a high elevation, and swept by cold and cheerless winds. It seems, therefore, a result of the varieties of climate and soil prevailing in Devonshire, that a system of farming has arisen there combining nearly every branch of practical agriculture. Dairy and tillage farming, of course, form the principal feature of this system, but the cultivation of orchards, the irrigation of meadows, and the breeding and feeding of stock are also extensively pursued. These do not form separate occupations, but are generally combined in each farm, and carried out as the convenience of the farmer and the resources of his land suggest. Perhaps a mixed system of agriculture like this may appear little calculated to attain that degree of successful development which is generally supposed to follow the concentration of industry within those boundaries which the division of labour suggests, but such does not appear to be the practical result. Devon cattle, Devonshire cream, and Devonshire cider are all equally famous, and we are informed, and have reason to believe, that of late years especially, the practice of agriculture has made great progress in this county. We directed our inquiries carefully to ascertain what were the causes of that

progress, from what period it dated, and what it had effected.

The information obtained by us does not lead us to ascribe the improvement which has taken place in any considerable degree to the landlords, whose position naturally suggests that they should at least lead the way in that respect. Within the last two years they appear to have made some advances towards the permanent improvement of their estates; but, with a few exceptions, up to that time they are said to have done almost nothing. They are, however, generally accused by the farmers of being thoroughly alive to the value which their tenant's capital and skill add to their lands, and of having increased their rental upon that value as well as upon the value derived from the general progress of the country as often as they well could. Of course there are two sides to every story, and the proprietors of Devonshire may not be so much to blame in this respect as they have been represented; but we were informed by a gentleman in every way qualified to give an opinion on the subject that during the last twenty years the rent of land in this county has been increased one-third. In support of these complaints against the landlords, the farmers state that they were often saddled with the expense or keeping in repair of the most inferior description of farm-buildings; that they were frequently subjected to the excessive competition for land in one of its most injurious forms, from the system of letting farms by private tender; and that the free use and economical management of their occupancy, for which they paid full value, was withheld from them by the absolute restrictions placed on the removal of hedge-rows. We asked why the hedge-rows were the objects of such solicitude, and were told in reply that it was for the sake of the timber growing in them, which before the alteration of the duties on imported timber was very valuable, but which since then had become greatly depreciated. Our informants concurred in the unanimous expression of their satisfaction at that reduction of price, and, as they talked of it, their wrath against free-trade became sensibly diminished for a time.

As to the question whether the recent improvements in the agriculture of Devonshire have originated mainly in the enterprise and skill of the farmers themselves, the tendency of the evidence we received would lead us to believe that such is the case. To understand this distinctly it is necessary to observe that the farmers of this county are divided into two classes, one consisting of men with small holdings, little elevated above the condition of the labourer, the other of men holding large farms, and who, being educated as well as practical agriculturists, have been gradually introducing improved methods of developing the resources of the soil. In this way, though an immense arrear of useful and profitable labour still remains to be performed, draining has been introduced, and is struggling into general use; the levelling of hedgerows makes some progress, an increased breadth of meadow irrigation has been secured, the value of artificial manures begins to be recognized, and the breeding of Devon cattle, one of the most graceful and shapely kinds of the species in this island, has

been brought to a high state of perfection. On this point Mr. Turner, of Barton, near Exeter, a well-known breeder of Devons, and who very kindly showed us his stock, ingeniously told us, though himself a strong protectionist, that he had lately exported a considerable number of cattle to the continent, and that they were held in great estimation by the foreigner, who paid large prices for them. As a further illustration of the progress which agriculture has been making in this county we may mention, that in one parish in North Devon there are now 800 acres of green crop raised, where eight years ago there were only 80.

In order thoroughly to understand the position in which the landlord and tenant have hitherto stood with regard to each other, and to appreciate the circumstances under which improvements have been undertaken by the latter, it is necessary to explain the terms upon which land has been let in Devonshire. Formerly leases for life were very common here, having been introduced by the necessities of the landlords, who granted these leases at nominal rents for the value of the land at about 18 years' purchase. This system was found to work very injuriously, people being induced to eke out, by credit in some way or other, their own scanty capital for the purchase of a lease for life, and being unable afterwards from want of funds, or unwilling from the uncertainty of the tenure, to develop the resources of the leasehold they had secured. A good number of the farms in Devonshire are held in this way, especially on the worst-managed estates with the poorest tenantry, such as those of the late Lord Rolle, the rental of which forms an immense fortune accumulating during a long minority in the hands of trustees for the benefit of the heir. Of late leases for lives have been discountenanced, and in their stead have been generally substituted leases for years. For large farms these are usually from seven to ten years in duration, and for small they have a six years' term, with a break at the end of three years, which, if not taken advantage of, extends the term three years more. It is worthy of remark that the improvements in agriculture throughout Devonshire are said to be cotemporaneous with the change from the old relations between landlord and tenant to the new, and, though the terms of the leases for years are generally complained of as much too short, they appear to be looked upon by the farmers themselves as infinitely preferable to the tenancies from year to year, which are so prevalent in other parts of England. The rent of land in Devonshire appears high, compared with that of the districts we have as yet visited; but perhaps the increase is due to the greater productiveness of the land, and the mildness and salubrity of the climate. Of course, over so large a tract of country, with such varieties of soil, situation, and other influences to affect them, farms let per acre at very different rates, and it would be quite impossible to strike an average with any degree of accuracy; but we may mention, as an illustration of the subject, that within a circle of three miles round this city, on a fine deep soil, well adapted for the growth of corn and green crops, rents range from 30s. to 50s. per acre, the local burdens, or "outgoings" as they are called, amount-

ing to about one-third more. We found that the poor-rate varied exceedingly, being high in one parish and moderate in others, according as the labouring population happened to dispose themselves in villages conveniently situated for the supply of employment. Tithes formed a subject of much complaint among farmers, on the ground that the averages which regulated the amount thus payable were struck from the prices of seven years instead of a more limited period.

The Devonshire tenant being at once a dairy farmer, a breeder or feeder of cattle, of sheep, and of pigs, and a grower of corn and of cider, this variety of occupation, arising naturally from the character of the climate and soil of the county, as already described, has given to him a tone of intelligence and activity which one looks for in vain in a district like the Vale of Gloucester, where a monotonous routine narrows the intellect of the dairyman. Farms generally are of moderate or even of small size, and, although individual farmers may hold 600 or 700 acres in several separate farms, the great majority run from 50 or 60 to 200 or 250 acres. Farm buildings are very often found collected in a village, the housing of four adjoining farms being placed at their point of junction, which of course must also be the extremity of each. In an earlier age of the country this arrangement may have been necessary from motives of self-defence or the pleasure of society, but now it is attended with inconvenience, and must increase the cost of production by waste of power in the cartage of produce. The buildings are of every variety of character, from the antique and dilapidated to the more modern and convenient form. On badly managed estates the farmer is frequently bound by covenant to uphold in repair the most rickety old mud and wooden houses at a cost to himself of as much as 10 per cent. on the rental of a small farm; and we were assured by one respectable farmer on the Bickton estate, that often in a windy night he got up and looked out with dread, lest his live stock should be destroyed by the whole fabric being blown down on the top of them. Having ourselves inspected these buildings, we were at no loss to account for the apprehensions of the tenant. Accommodation of any proper kind for the accumulation and preservation of manure is in such cases out of the question, though where there is plenty of straw the cattle seemed warm and comfortable. The better class of buildings are generally in the form of a square, close all round, and entered on the south side through a large arched door under the granary. Immediately opposite is the barn, cider-cellar, &c., which usually occupy one side of the square, having the corn-rick yard behind. Two sides are for the accommodation of cattle, the back walls being built close up to the eaves; the front is in two stories, supported on strong posts of timber, open from the ground to the eaves, the lower story occupied by cattle, the upper kept as a store for their provender. The cows are usually kept in loose boxes; the fattening cattle generally tied by the neck. The fourth side of the square embraces the farm-stable and waggon shed.

The soil, as already mentioned, is of very various character, good turnip and barley lands being in-

termixed with wet, stiff, unkindly soil, generally very imperfectly drained. Tracts of fine green crop land of deep friable texture are met with in continuous succession, and there the cultivator reaps the best returns. The system of husbandry followed is the alternate one, varied by allowing the land to rest one or more years in grass, as may be thought best by the farmer. The four or five field course would be an inappropriate term to use in this county, the number of hedgerows and fields on each farm being so great, that a 40 or 50 field course would more truly designate its husbandry. To give an idea of this, we may mention one case related to us by the tenant of a farm of 160 acres, from which seven miles of hedgerows were removed, and, on the ground being measured, it was found that 13 acres of land were gained by their removal. Nor is that farm by any means bereft of its hedgerows, the fields still being on the average not more than 10 acres in size. Where the ground is exclusively kept in pasture, the shade and shelter afforded by the trees may in some degree compensate for the injury they do. But where the land is not adapted to continuous pasture, and is necessarily left by the landlord for tillage, there can hardly be anything more injurious to the tenant than this multiplication of fields and hedge-row timber. Every operation of husbandry is impeded, a constant shifting of implements from field to field occasions waste of time, and does positive damage to the implements and the fields through which they are passed, while the corn in harvest is frequently injured by the difficulty, in this comparatively moist climate, of getting it aired in these small close fields. But the direct injury sustained by the crops being robbed of their food by the hedge-row timber is most strongly shown in a turnip-field. "Look at these thieves," said a farmer to us, pointing at three stately elms; "I warrant there is not a root as large as an apple within many yards of them." On measuring the ground, we found that for 40 feet out into the field from the hedge-row opposite these three elm trees, the crop was quite diminutive, while immediately beyond their influence the size of the turnips was quadrupled. An idea of the positive injury thus inflicted on the tenant may be guessed at, when we mention, further, that 40 feet extended across about a fifth of the field, from the opposite side of which another line of trees spread their voracious roots. From one hedgerow pointed out to us, extending along one side of a five-acre field, 60 large elm trees were cut last season, and there still remained a superfluity. Till within the last two years very few landlords would listen to any complaint on this head (some are loth to do so still); but the value of the timber has fallen so much, and the tone of the farmer has become so stern, from the pressure of low prices, that less difficulty is now felt in getting leave to remove superfluous hedgerows. Their existence may be considered rather a fortunate circumstance at present, inasmuch as the value of the timber, and the amount of land gained in their removal, will amply compensate the expense, while the employment afforded in the operation will take up any superfluity of labour.

There is nothing particular in the management of the arable land, which, however, is well and

deeply tilled, not very heavily manured, but managed, on the whole, where the tenants have sufficient capital, with much sagacity and skill. Two-horse ploughs are universal, and light carts and waggons. Oxen are occasionally used in the plough, two young and two old ones being yoked together. They are fed very cheaply, and will plough an acre a day. 16 to 24 bushels of wheat may be reckoned an average produce for South Devon, and 32 bushels of barley. Stubble turnips are occasionally taken, but the general practice is a bare winter fallow in preparation for a root crop. In many districts of South Devon the soil and climate seem admirably adapted for crops of early potatoes, to be followed by turnips; but we did not hear of this as in any degree a systematic practice. The mildness and moisture of the climate would also indicate the advantage of taking crops of rye, winter vetches, &c., for spring feed; but the attention of the farmer does not appear to have been much directed to this, very possibly on account of the irrigated water-meadows having hitherto afforded such food in sufficient abundance. Nor does it seem that early lambs form much an object with the farmer, though it might be expected that such towns as Plymouth, Exeter, Torquay, Dawlish, and other watering-places on the coast, occupied by rather a wealthy class of residents, would have afforded a good market for such delicacies.

In dairy management Devonshire is justly celebrated, the perfect cleanliness and freshness of the dairies we examined forming a marked contrast to what we saw in some other counties. Where the best butter is made the cows are fed in winter on fine meadow hay—seldom any roots. They are turned out daily for an hour or two, generally to the orchard, where the trees afford them shelter; their dung benefits the roots, and they are kept off the pastures, which would be injured by their feet in wet weather. Cabbage is seldom given for the winter food of the cows: mangold is occasionally given. Dairies are frequently let by the farmer to a dairyman, who pays for the use of the cow, which is fed at the farmer's expense, and managed by the dairyman. A sufficient supply of grass and hay is provided, and for this the common rent paid by the dairyman for such cow is £9 a-year, it having fallen £1 since last year. Fresh butter and clouted cream are the products of a Devonshire dairy. Fattening cattle are supplied with 4lb. or 5lb. of cake daily, in addition to cut turnips. Sheep are bred and fed on most farms, the young sheep being sold fat when a year old. They are occasionally supplied with cake when feeding on turnips. The lambing ewes are placed on the watered meadows. Pigs are fed on every farm, and are well managed.

The value of watered meadows is highly appreciated by the Devonshire farmers, advantage being taken of every little stream to increase the produce of the land. The warmth of the numerous vallies in this county is highly favourable to rapid growth, and the declivity of their sides affords a cheap and most convenient means of laying on the water. The expense of cutting the gutters where the land is suited for "catch meadow," may be about £2 per

acre, and the annual cost of keeping open the watercourses and laying on the water about 5s. an acre. The increased produce is fully 100 per cent., but this depends mainly on the quality of the water applied, which is found to vary extremely. Its value is believed to depend partly on the warmth it affords to the soil over which it passes, and partly to the deposit it at the same time makes.

The cider orchard is another source of income to the Devonshire farmer, the value of which has decreased nearly a half within the last few years. An orchard produces 10 to 15 hogsheads an acre, the selling price of which at present is 25s. to 30s. a hogshead, and the cost of preparing it 3s. to 5s. As much as 150 hogsheads are produced on some farms, the half of which is consumed by the farm labourers. On one extensive farm we were assured that 100 hogsheads of cider were annually drunk by the labourers, the consumption averaging three-and-a-half hogsheads per man! The wages of the labourer vary from 7s. to 8s. and 9s. a-week, with three pints to two quarts of cider daily, the men bringing in every morning their wooden bottle to receive their day's allowance. Taskwork is much encouraged, and better wages are earned. Little or no reduction has yet been made on the labourer's wages. Women are not employed at outdoor work.

In many parts of the county, where the land is reckoned too stiff for profitable green crops, it is necessary to have a bare summer fallow. That is usually made after grass, the land being well ploughed early in winter, and four or five times turned over during the following summer, after which a dressing of lime is applied and the wheat sown. The produce does not average more than 16 to 20 bushels. This is followed by oats, which are usually a good crop, probably 50 bushels an acre. With the oats the land is sown out to pasture.

In Devonshire we found among farmers a unanimous expression of opinion that prices must either rise or rents be reduced. It was stated that many of the farmers were putting all the land they could under the plough for corn crops, and discontinuing the use of purchased manures, in order to get as much as possible out of their farms at the least expense, previous to giving up possession. This, however, was not the case where abatements were given, and it was generally admitted that if a fair deduction of rent was made tenants in most cases would be able to withstand the present pressure. A general reduction of rents is, in point of fact, the great object which they are all now striving to accomplish. As yet the landlords have shown little disposition to grant this; but whether they decide to do so or not, we think it right to state what we heard on most respectable authority, that there will be a combination, quiet but effectual in its action, on the part of farmers to compel an abatement. We found produce rents strongly advocated, several gentlemen giving it as their opinion that the relief afforded thereby would in most cases be sufficient to enable the farmers of Devon, who had sufficient capital and skill, to meet the times.

(To be continued.)

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The last monthly meeting for the season, previous to the usual summer vacation, was held at the Club-rooms, Blackfriars, on Monday, June 3rd. The chair was taken by Mr. Payne, of Felmersham. The subject was introduced by Mr. Baker, being thus stated on the card—"Upon high farming, showing how and to what extent capital can be applied to a given quantity of land to ensure the greatest amount of profit."

Mr. BAKER said: The subject to be treated of by me on the present occasion is—"Upon high farming, showing how and to what extent capital can be applied to a given quantity of land to ensure the greatest amount of profit." In approaching this subject I am aware of the difficulty that is presented, seeing that so wide and extensive a field presents itself for investigation. At the same time that opinions differ so widely upon the subject, it is necessary that the investigation should be entered upon with the utmost care and circumspection, seeing that the subject is one that has often been approached, but seldom practically demonstrated. I am aware of the extreme difficulty that arises upon even approaching the subject, and which, as we proceed, like the undulation of water, increases as it diverges, until at length it becomes merged in the surrounding element. It is not my intention to enter upon the subject for the purpose of showing what amount of capital may be applied to the cultivation and improvement of land, as I am too well aware of the difficulty I should have to encounter in the various opinions I should bring into array against me, and therefore I propose to treat this investigation entirely as a question of farming, in the common acceptance of the word. I shall presume that the occupation is carried on by a person in the strict sense of the word "a farmer," who hires land from which, by cultivation, he expects to realize sufficient profit to remunerate him, a fair rate of interest for his outlay of capital, as well as a fair recompense for the application of his talent and skill. In fact I shall consider him as a manufacturer of grain, meat, wool, &c.; that the land he cultivates is a substance from which he is to extract articles for sale; and that he is secured for his outlay either by having a term of years sufficiently long allowed to recover his investment, or that at last he shall be paid for such improvements as may remain unexhausted in part or altogether. Unless these points are conceded it will be impossible to carry out the investigation satisfactorily: and it will be also necessary to premise that the land is of medium quality, both as regards its expense of working and productiveness, that a moiety is especially adapted to the growth of turnips and green crops, and that the other portion is adapted for the cultivation of grain crops, and that the whole quantity is adapted to the growth of wheat, and grain of every description. The rent to be assumed as equal to one-fifth of the fair average produce of the farm under a usual and ordinary

state of fair cultivation, that the land is adapted to the four-course shift of cultivation, and that the capital employed shall be that which a renting tenant ought fairly to be supposed to command, being equivalent to the entire cost of entering upon and cultivating the farm for one entire year and a-half, inclusive of drainage, which shall be charged by the landlord, at the rate of 5 per cent., as additional rent during the term. I have been thus explicit because I am endeavouring to give a practical investigation to my subject, and without data it will be impossible to conduct it in a satisfactory manner. Intending to make myself clearly understood, I must premise in the first instance that the farm is already in a fair state of cultivation, and capable of producing the under-mentioned average crops by means of the fair ordinary mode of cultivation:—100 acres fallow and green crops; 100 acres barley and oats; 100 acres clover, peas, and beans; 100 acres wheat. The produce will be 70 winter food; 30 summer food. It would be difficult, or even impossible, on a subject embracing so wide a field for discussion, for any one to approach it except upon generalities; and I therefore shall endeavour to condense it as much as it may be possible, to enable me to convey to my hearers the intention of my observations, and by thus giving an outline only, leaving it in their hands to be commented upon as may best accord with their opinions and be applicable to their respective localities. It has been affirmed that there is in farming cultivation no limit to production, if attended with sufficient application of capital and skill. To this proposition I quite accord, as we have within its range the most extensive field for improvements that can be effected by the most elaborate and expensive application of capital in the shape of labour and manure, aided and assisted by a thorough knowledge of geology, chemistry, mechanics, botany, entomology, and mineralogy—indeed every science connected with physical geography offers its assistance to the ardent and wealthy experimentalist and cultivator of the soil; but I consider, in pursuing this investigation, as set down for this evening, that my object will be best secured and more effectually obtained by taking up the question as a farmer's question, and in examining its various bearings, to consider it as an occupation carried on for the sole object of remuneration and profit, and to treat each investment as made with reference entirely to that object. In fact I shall consider the land in its twofold character: first, as to the investment made by the landlord, by which the largest return by way of rent can be produced; and secondly, by the tenant, as a business carried on, which, by his application of capital and skill, may be made to realise the largest possible annual return. I shall therefore premise that as the value of the produce is to a certain extent limited, so must the application of the means of cultivation be limited to secure that object, and to yield

a profit ; and here I must further premise, that in carrying out this discussion all remarks made by others should have an especial relation to that object, and that nothing should be advanced that has not been practically tested and found correct. We do not meet to-night to ascertain how much money may be applied to the cultivation of the soil, but how much may be applied to ensure the greatest amount of profit to the cultivator. It has been asserted from the earliest period that success in farming depends more upon attending to minutiae than to carrying out the leading principles. To this I only partly assent, for I hold that unless farming is treated like any other undertaking, by having its main leading principles methodically arranged and carried out, not only as they involve the ability and experience of the cultivator, but also as regards the application of the means, that it must undoubtedly fail. It pre-supposes the utmost foresight, vigilance, and unremitting attention of the cultivator, as well as economy in labour and application of capital ; in fact, from the commencement to the end, it is one continued series of applications of minute divisions of labour and small payments, which are sought to be recovered, with a surplus by way of profit ; and I therefore insist upon the necessity of viewing the question entirely as producing that result. In what is called high farming, a risk from seasons follows to an extent almost as certain, and proportionably equal in extent, to that which attaches to the regular system. In moist seasons the corn on highly cultivated soils runs out to such a length of straw as to render it liable to become lodged, which inferior crops escape. I mention this to show that as we proceed towards the realization of increased produce, that so the hazard in a contrary direction becomes greater. Robust health and fulness of habit in individuals is liable to be arrested by inflammation and apoplexy on the one hand, which are equally destructive in their character as lingering diseases arising from debility and privation on the other ; so with farming. Heavy crops are subject to vicissitudes of seasons, almost if not to an equal extent with those of inferior descriptions ; to guard against which, so far as science and foresight will effect, constitutes the experienced farmer. It is not from doing much at one time to any particular piece of land that success is ensured, but by steadily pursuing the object from the beginning to a general attainment and improvement of the whole farm that success will be realised ; by a constant and vigilant attention, by doing what is necessary to be done at the proper time and in the proper manner, and by executing every thing well at the least outlay, the success in the main depends. I have found by experience that even the leading management, much less the details of farming, cannot be satisfactorily left to others for execution, unless they are sufficiently interested in the result so as to insure vigilance and attention at all times ; and thence the ill success of those who farm for profit by the instrumentality of others, who, having no direct interest to induce them to enter with proper spirit and economy into the carrying out details, at last find themselves woefully disappointed and losers by their undertaking. Marshall, a writer about 100 years ago, powerfully illus-

trates this at the commencement of his Diary, in these words — “Yesterday discharged Thomas White, my farming bailiff. I employed him to assist me to manage my men, but found he has been assisting my men to manage me. He was a good implemēt of husbandry, but a crazy branch to lean upon. I am determined henceforth to become my own bailiff ; and by noting down the day’s miscarriages, learn in future to avoid them,” &c. He proceeded upon his task, aided alone by the most powerful and sanguine temperament, aided by judgment and education ; and by giving us, as he does, a statement of his daily experience through a period of several years, we at once perceive that the rock upon which he split was a neglect of the small necessary matters in his farm management. Every blunder was a charge upon his management, every failure a positive loss, until at last he was wrecked in the pursuit of an object which he sought so ardently to attain. At a much earlier period Tusser was another example of astute knowledge brought to bear upon agriculture. He observed more intently than others, and wrote with greater correctness than any succeeding writer upon the subject. His book is a series of aphorisms ; and even at the present day the “Five Hundred Points of Husbandry” may be read with advantage, and for two hundred years was almost the only book in general repute amongst farmers. But Quarles in his Book of Emblems portrays him as whetstone to a scythe—blunt himself, but giving an edge to the minds of others ; and he goes on to say that he was considered during his life to have great farming intelligence, but that he was a “*rolling stone, and gathered no moss*,” and at length was obliged to the generosity of his patron Lord — for a subsistence in his declining years. Unfortunately in the present age it has been equally so to a great extent. I have lived long enough to have observed the ill success of many who, with ample means, with abundant skill, with energy and application unexampled, have failed in their object, arising entirely from deputing others to carry out the execution of their designs, and through their neglect sinking in the struggle which timely precaution might have prevented. But I hope I may be excused this digression, and will now return to the subject from which I started, and endeavour to show how the largest amount may be realised, so as to afford a profit, and in my estimation will state the mode I think best to attain that end. I will presume, therefore, that the land having been thoroughly drained and cultivated, and the investment made, that we are in fair progress to realisation ; but it must not be expected that such result can be made in the first year ; it will take at least four years before high farming can begin to repay ; the land must participate in the general benefit to arise from extra cultivation and manuring for at least that period ; but if the land had previously been under a worse than an ordinary state of cultivation, it will require at least seven years before it may be said to be fully established. The main features to be attended to are, the producing a large amount of green crops for consumption by cattle and sheep, to make such application of inorganic substances to the soil as may be necessary to insure suc-

cess—in fact, by the addition of lime, chalk, clay, silica, &c., as may be necessary for the general amelioration of the soil; to apply the manure produced upon the farm with the utmost economy and care, keeping in mind always that two light dressings will at different periods produce a greater return than one heavy one for all grain crops, whilst to green crops it will be necessary to apply manure more bountifully, as no damage will ensue by producing them as fine and at the same time abundantly in quantity as possibly may be effected; and as regards the application of guano, it will be found most advantageous to apply it to the production of root and other green crops in preference to grain crops, reserving the farm-yard manure as much as possible for the latter. And it may be worth while here to observe that by a series of experiments communicated to me by a most intelligent cultivator, as well as derived from other sources, it has been found that more than 2 cwt. of Peruvian guano applied to each statute acre of wheat or barley did not repay the cost of the application, as it was found, in numerous experiments, that as the quantity became increased, the result diminished the quantity of grain, although it would have been considered otherwise, as the straw was materially increased, and by increasing the quantity to 4 cwt. per acre, no increase whatever in the grain was visible from that where no application of it took place. With grass it was otherwise, and with root crops also; an increase in quantity upon the former produced a greatly increased amount of grass, until the evil was apparent in the opposite direction by the weakness produced in the stems being such as to cause the crops to become lodged, whilst with root crops 4 cwt. or even 5 cwt. could be used if applied with advantage, but 3 cwt. appears to be the quantity that may be used with the greatest advantage; and in every experiment made by myself, when not drilled, I have found the better plan to sow it and cover with a shallow ploughing a few days previous to ploughing for the depositing the seed; by such process, even in dry weather, we need not fear losing the guano by evaporation, as on its being covered in, the ammonia becomes at once fixed and therefore not liable to escape. The making and management of manure, next to draining, is the most essential operation towards the improvement of the farm. Much diversity of opinion at the present time exists as to the mode in which it should be carried out. One class, and that a very limited one, contends for the system of lodging the cattle upon latticed floors, so that the manure may escape through the interstices and be collected below. In that case I think the means as hitherto resorted to are not complete; the flooring below the latticed floor should consist of an inclined plane, from the front to the back of the building, and should be first laid with concrete and covered with asphalte, and when the moderate cost at which this can be effected is estimated against the advantage to be derived, it will be at once apparent; every portion of the manure and urine of the animals will be thereby saved and easily conveyed to receptacles behind, for mixing with ashes, burnt earth, or other substances; the opening will also allow the man attending the cattle to easily clean away manure, or even wash

down the floor in the best manner. The detail of application afterwards I shall not enter into, having never practised the system, and until I am convinced more of its utility than I am at present, I fear I never shall, except so far as mere experiment may lead me. I have not come to this conclusion without sufficient reason for so doing, and I am quite satisfied that upon corn farms the better mode of making manure is to use all the inferior straw for litter, and for the purpose of absorbing the animal faeces; we thereby have it in the most convenient state for application to the soil, and thus return the ingredients that have entered into the formation of the straw to the soil. The system next introduced is that of confining the cattle separately in covered sheds, called boxes, the floors of which are sunk several feet below the surface in each division; in these places, about ten feet by eight, the animals are kept for several months together, fresh litter being added daily; the accumulated manure thus made is found to be highly concentrated, no other moisture having been admitted but such as is deposited by the animal, and it is doubtless one of the best modes of producing manure. But it is objectionable on some accounts, for young animals especially, whose growth is better insured by having liberty of action, and having a constant supply of fresh air, and it has been found injurious to them if afterwards subjected to the changes of atmosphere that follow upon exposure; therefore for all breeding stock it is highly objectionable, and, as a system, can only be made applicable to fattening cattle, or for cattle designed from the commencement for fattening; besides, upon a farm where a mixed description of cattle is kept, the extent of covered building required would be greater than landlords are disposed to erect, and it is a question still unsettled whether the advantage to be gained is equivalent to the annual sum that would as a per-centage be chargeable upon such a system of management. Another, and certainly, in my estimation, a more beneficial mode, is by covered yards, in which a number of cattle may be kept for rearing or fattening purposes. No rain-water should be allowed by this process to fall upon the manure in the yards, and in fact the result is the same as in the box-feeding system, the only difference being that the cattle have liberty of moving about over the whole extent of the yards; but judging from observation, the manure thus produced is better than I have seen under any other system. The Rev. Mr. Cooke, of Semer, in Suffolk, has perhaps more fully succeeded than any other person in carrying out this system; his yards are well arranged, and the buildings judiciously constructed, and as models may be viewed with advantage by any one desirous of adopting this certainly most excellent system. The common and almost universal practice in this kingdom is to keep the store and breeding stock in open yards, and to stall the oxen under covered buildings, the manure from which is, or ought to be, daily spread over the yards, to be trodden in by the stock moving at large; but it unfortunately happens in the majority of cases that the rain water falling upon the building descends into the yard, and flows through the manure exposed to its action, and thus a very large

proportion of its valuable quality is lost, and too frequently is seen stagnating in the open ditches, or running to waste in various directions; but this may be materially obviated, and perhaps sufficiently upon corn-growing farms, by having the eaves of the buildings supplied with cast-iron or zinc troughing, and thus convey away the water by underground drains. If this process is well carried out none of the valuable properties of the manure need be lost, for if no part of the deposits of the cattle are allowed to escape every portion must be retained, not in so highly a concentrated state, but sufficiently so for all useful purposes. As the object of this discussion is to ascertain the best mode of producing manure as one of the essential points to insure success, I have been the more minute in describing the various processes resorted to, and must leave every one, under the various circumstances of place and convenience, to adopt that mode which can be most readily applied; the result will be pretty much the same if every portion of the deposits of the cattle is made available. The application will nevertheless be the same, provided the respective farms are of similar character; but as I presume that in every occupation more or less green crops are annually produced, the intention should always be to secure the largest possible quantity of the manuring properties that those crops will produce by feeding with cattle and sheep, and it has been found that the sooner the application of manure is made to the land after removal from the sheds or yards the greater the effect, and, therefore, it should never be allowed to enter into active fermentation if it can be avoided; but as a difficulty arises frequently to prevent that object being carried out, then it should be carted out and consolidated as far as possible, by drawing the loads of manure upon the heaps, and after the sides are trimmed, then to cart upon the heaps as much fresh earth as will keep the whole mass in as compact and solid a state as possible; and a few days only previous to application, to fork it over for the purpose of mixing, and as soon as it has arrived at a state of fermentation to cart it upon the land, and plough it in as quickly as possible. It is true that a small portion of the gases thus generated by fermentation will escape; but, on the other hand, the manure will become far more portable, and will eventually give a better result, than if turned-in in quite an undecomposed state. I have practised both modes, and have found in dry seasons that the application of raw manure is frequently injurious to the crops from keeping the land open and porous, and therefore rendering it liable to be affected by drought. The chief application of the manure should be for the production of the green crops or such other crops as precede the wheat crop; the latter will generally succeed better after a crop of beans, peas, clover, or turnips have intervened between the wheat crop and the manure than when the application is made direct for the wheat. Farms now said to be high-farmed must be considered as having external aid by the assistance of guano or other portable manures, purchased for producing the turnip or root crops; it is more suitable to their growth than for corn crops, as experience proves; and by a liberal application

of it, nearly or even the whole of the farm-yard manure may be spared for grain crops. The horses, and indeed every description of stock, should be foddered in yards during the summer, as well as in the winter, and it would be better that each horse have a division to himself, or only four horses be kept in each yard. All the green food should be cut into chaff, first using about one-third of green to two of dry food, increasing the quantity until the proportion is reversed, or the dry food superseded altogether. The detail, as pursued by myself, I will give in a letter that I drew up at the request of a gentleman, and which process I am now pursuing, having, from the middle of April last in the current year, foddered all my horses and most of my neat stock upon that system. Whatever mode is pursued, it is important that a dressing of at least 10 or 12 yards of manure should be raised for every acre of arable land yearly; and I assert that, under proper management, it may be accomplished. In addition to the green crops thus consumed, every portion of hay, to be cut also into chaff, should come into use upon the farm during the year, and as much also of the green crops as can be applied with advantage; but I am doubtful that cattle, sheep, or pigs can be fed upon grain with any profitable result, except so far as they contribute to the quantity of manure raised upon the farm. A bushel of barley or peas has always been considered as equivalent to the production of a stone of 8lb. of meat; therefore if the price of the meat is less per stone than the grain per bushel, the difference is a loss, and *vice versâ*. Upon the judicious application of manure much of the success of the cultivator depends. By an application of it too liberally, as much injury may ensue to grain crops as by doling it out too sparingly; and, therefore, practically speaking, the judgment of the cultivator will be manifested to the casual observer by the even character of the crops produced over the whole farm, and not, as is too frequently found on the side of public roads, that the fields, from having been more highly manured, have crops luxuriating in rank vegetation, whilst those fields not under observation, and at a distance from the homestead, have crops of a starved character and appearance, contrasting themselves like the fat and lean ears in the old prints of Pharaoh's dream. The successful application of manure should, as far as possible, be at once to cart it on and cover it in speedily with the plough, especially for green crops; but in autumn it frequently happens that large masses have to be moved for the coming crops of wheat and beans, and then it is absolutely necessary that the dressings be completed during the continuance of weather suitable and as expeditiously as possible. I may, I fear, be exceeding the ordinary limits of the discussions by dilating to such an extent upon these essentials of high cultivation, viz., the producing of manure, and by its application yearly increasing the general character of the soil and progressive advancement of the condition and power of the farm to maintain itself in the highest possible state—produce crops, by cultivation and judicious management, to make the largest return with the greatest amount of profit. Another most important point is, how best to effect that

object by the system of cultivation to be pursued, and I must therefore presume that the farm is sufficiently stocked with active horses at all times to carry out an expeditious system of converting the land to the production of the forthcoming crop, immediately upon the present one being removed; for unless such is the case, it will be impossible to realize the largest available produce that the farm will give if its ability is not taxed to the utmost. It will, therefore, be necessary at all times, and through all seasons, that the number of horses be sufficient, especially during the summer months. As soon as any crop is removed, the more speedily the land can be ploughed the better, not only as a means of keeping down weeds, but also by keeping the land in good tilth, and available for the production of the forthcoming crop. This system, pursued for a series of years upon the same land, will almost eradicate weeds, and the hoeing of the crops will thereby be comparatively reduced to a modicum of what originally was the case. It may perhaps save time if I show the particular cultivation of one field

as it has taken place during a series of years, as better exemplifying the system pursued, than by dealing generally with the question. The land referred to is of a light or gravelly character, with a subsoil of sandy loam and strong loam or clay alternately, with a fair depth of staple, originally of a poor character, producing the wild radish, known as white charlock, corn mangold, may-weed, and a species of vetch called tare-tyne, which on the lighter portions of the land used to grow up with the wheat and grain crops to such an extent as to be out of the power of the hoe to eradicate without partially destroying the crops with them. By an application of chalk clay in quantities varying from 60 to 120 tons per acre, all those pests have disappeared, and by that process and thorough drainage alone, the produce has been doubled; until this operation was effected (and which it took several years to complete) the application of manure was of little avail except in the production of green crops, for which the land was always well calculated. The cultivation during eleven years was as follows:—

	CULTIVATION.					MANURE.			CROPS.	
	Ploughing.	Scarifying.	Harrows.	Drillings.	Rollings.	Manure.	Clay and Chalk.	Guano.	Soot.	
						Tons.		Cwt.	Bush.	
1839	3	1	4	1	1	—	—	—	—	Wheat.
1840	5	3	8	2	3	16	40	—	—	Rye, and tares, and swedes drawn.
1841	1	1	4	1	2	—	—	—	4	Barley.
1842	4	2	4	1	1	20	Earth and Lime, 20	—	—	Early peas, turnips, part fed, and part drawn.
1843	2	—	4	1	2	—	—	—	—	White oats.
1844	1	—	4	1	1	10	—	—	30	Wheat.
1845	5	1	6	2	3	16	—	2	—	Rye, and rye and tares, mown green, Swedish turnips
1846	2	2	4	1	2	—	—	2	—	Barley.
1847	—	—	—	—	—	—	—	—	—	Red clover twice mown.
1848	1	2	4	1	1	12	—	—	—	Wheat.
1849	3	1	5	1	2	6	—	—	—	Barley.
	—	—	—	—	—	—	—	—	—	Now green crop.
	26	13	47	12	18	80	60	4	70	

The foregoing has been indiscriminately selected, and the statement not in any case exceeding the actual number of operations. This put into comparison with some of the statements that have lately appeared, especially that one of Mr. Huxtable, showing how wheat can be produced by one ploughing and a few pounds of ammonia, if not disproving others, at least exhibits a system practically applied for a series of years without regard to public exposure, and which, if it has no other recommendation, at least involves a large amount of labour, and exceeding that stated by Mr. Mechi as his maximum, viz., 40s. per acre. It would have facilitated this investigation had I been able to have given the quantities produced in each year, but this I am unable to do. The average, I presume, of wheat to have been about 4 qrs.; of barley, 6 qrs.; oats, 7 qrs.; clover-hay, from 3½ to 4 tons; Swede turnips about 20 tons; of rye, cut green, 10 tons. The pea crop was a deficient crop, all the green crops productive. The expenditure yearly will stand thus:—

Annual cost of manure per acre.

80 loads of manure, about one moiety carted from town at 5s.	£20	0	0
40 loads chalk clay 1s., and carting 2s. 6d.	7	0	0
20 loads of lime and earth.	2	0	0
70 bushels of soot and carting, 6d. ..	1	15	0
4 cwt. of guano.	2	5	0
	11)	33	0
		£3	0

Manual labour and general expenditure per acre.

Harvesting wheat and barley, six times at 15s.	£4	10	0	
" oats once		0	14	0
Cutting clover, rye, and tares, and carting, at 11s.		2	4	0
Pulling and carting turnips, 3 acres at 24s.		3	12	0
Thrashing and carting wheat, 12 qrs. at 4s. 3d.		2	11	0
" 18 qrs. barley, at 3s.		2	14	0
" 7 qrs. oats, at 2s. 3d.		0	15	9
Tying and marketing straw, at 7s.		2	10	0
	11)	19	10	9
		£1	15	0

Cultivation by horses, &c.

2½ Ploughings, 8s.	£1 0 0
1½ Scarifyings, 3s.	0 3 9
4½ Harrowings, 10d.	0 3 6
1½ Drilling, 3s.	0 3 6
1½ Rolling, 1s.	0 1 9
Striking furrows and water-furrowing	0 1 0
Hoeing.....	0 2 0
Sowing soot and guano	0 3 0
	£1 18 0

General outgoings, rent, &c.

Repairs and incidental expenses ...	£0 2 6
Rent.....	1 7 0
Draining	0 5 6
Tithe rent-charge.....	0 7 6
Rates and Insurance	0 5 6
Interest on 10l. at 7½ per cent.	0 15 0
	£3 3 0

Summary.

Manure.....	£3 0 0
Cultivation	1 15 6
Do.	1 18 6
Rent and charges.....	3 3 0
	£9 17 0

By produce.

	At 56s.	At 40s.
Wheat, 12 qrs., net seed	£35 2 0 ..	£24 0 0
Barley, 18 qrs., net seed	32 0 0 ..	22 10 0
Oats, 7 qrs., net seed.....	9 0 0 ..	6 0 0
Rye and tares, 30 tons green food	15 0 0 ..	10 0 0
Swede and white turnips, 54 tons.....	27 0 0 ..	18 0 0
Straw: Wheat £6 0 0	13 10 0 ..	9 0 0
Barley 5 8 0		
Oats..... 2 2 0		
	11) 131 12 0 ..	89 10 0
	£11 19 3 ..	£8 2 9

TO MEET PROFIT AND RETURN OF OUTLAY IN IMPROVEMENTS.

Ordinary cultivation of one acre under four-course shift.

1 Acre ploughed 5 times	£2 0 0
" 3 Harrowings	0 2 3
" 1 Scarifying	0 3 0
" 2 Rollings	0 1 6
" Drilling	0 3 0
	£2 9 9
Manured with 16 loads, equal to 4 loads per acre per annum.....	1 0 0
Hoeing	0 7 0
Harvesting	0 14 0
Spreading	0 0 6
Thrashing	0 9 0
Carting	0 3 6
Sundries	0 2 0
	2 16 0
Rent, &c., as before.....	3 0 0
	£8 5 9

Second Year—Barley.

1 Ploughing	£0 8 0
4 Harrowings.....	0 3 0
2 Rollings	0 1 6
Drilling	0 3 0
	£0 15 6
Manure, hoeing, &c., as before	2 16 0
Rent, &c., as before.....	3 0 0
	£6 11 6

Third Year.

Clover, peas, or beans.....	£1 15 0
Rent, &c., as before	3 0 0
	£4 15 0

Fourth Year—Wheat.

1 Ploughing	£0 8 0
4 Harrowings.....	0 3 0
1 Rolling	0 1 0
Drilling	0 3 0
	£0 15 0
Manure, hoeing, &c., as before	2 16 0
Rent, &c., as before	3 0 0
	£6 11 0
First year	£8 5 9
Second year	6 11 6
Third year.....	4 15 0
Fourth year	6 11 0
	4) 26 3 3
Average cost of cultivation	6 10 9
Add for draining by tenant.....	0 0 0

By Wheat, 3 qrs. 4 bush. £2 16s. ...	£9 16 0...	£7 0 0
Barley, 5 qrs.	9 0 0...	6 0 0
Clover, 3 tons	£7 15 5 }	6 10 0... 4 7 8
Or peas or beans 3½ qrs., 5 5 }		
Turnips, 1 moiety fallow.....	3 10 0...	2 13 4
	28 16 0...	20 1 0
Straw.....	3 5 0...	2 1 6
	4) 32 1 0	22 2 6
	£8 0 3	£5 10 7

It therefore appears by this comparison, which has been drawn up without regard to the result, that the profit upon a large investment in farming is about the same proportionately with the smaller investment. Under the high farming the average expenditure would be £9 17s. per acre; the return, with wheat at 56s. including profit, £11 19s. 3d.; with wheat at 40s., £8 2s. 9d. per acre, showing a loss of £1 14s. 3d. per acre. Under the ordinary system of cultivation, of manuring the land once in four years and taking one crop of wheat, one of barley, one of clover, and one green crop, the result would be, with wheat at 56s. a return of £8 0s. 3d. per acre, with wheat at 40s. £5 10s. 7d.; the expenditure £6 10s. 9d. per acre. So that either under high farming or fair average farming, although the annual expenditure may be increased 50 per cent., still the crops under the same reduction will not yield any profit, but show a positive loss. In commencing this discussion, I had not the slightest intention of pursuing the subject in its present form; indeed I hardly knew how to treat it. The subject as put down on the card, although drawn by myself, was of such a nature that without travelling out of the record, I feel limited and constrained to act up to its spirit and the liberal sense as embodied in it. It may now be well to state that the conclusion arrived at would naturally follow, for viewing the cultivator of the soil as a manufacturer of corn and meat, which by the application of his skill and capital he extracts from the land he occupies, it must be evident that the quantity most cheaply obtained would be that which the natural produce of the soil would yield that assuming that the difficulty and expense of increasing production become greater as we proceed; so the appliances being more expensive (unless there is a compensating price in the article when brought to market), the increased cost of production will not be

reimbursed. It has in cases similar to the one now under discussion been of late the fashion to compare high or very good farming with very bad farming; but as good farming is now the rule, and not the exception in the present day, it is unfair to make such deductions. If wheat and grain cannot be produced at a profit under ordinary circumstances of low expenditure, and regular ordinary practical application, then how can it be produced at increased expenditure with greater profit? The subject viewed dispassionately is an anomaly if otherwise construed; I am nevertheless an advocate for producing the utmost possible quantity from each and every acre under cultivation, but I hesitate advising others to act up to that principle, until they shall be satisfied that prices will be sufficiently high to become remunerative; and it has been not only my opinion, but that of all practical men who have followed farming as a business, that by a proper alternation of crops and a steady and consistent system, more corn can be produced than by adopting the system of growing wheat in succession on the same land, or even more frequently than the intervention of ameliorating crops will allow, within a very short period. Wheat was and is still the grain by which the farmer meets his chief payments, and this he does without any consideration whether it produces him more or less than other crops: he still endeavours to obtain as much wheat per annum as possibly can be obtained, when it might have been that other crops would have paid him as well or better. In the commencement I started by saying that the question must be viewed as one of a farmer cultivating land for a profit, and therefore it would be quite apart from the question under consideration to suppose that under such circumstances a larger investment of capital would be made available than that which under ordinary circumstances would be made; if it were not so, then any one residing in London, by purchasing bullocks and hiring premises within the purlieus of Smithfield, and purchasing turnips, hay, and straw, might ostensibly be said to be a grazier, as much as he who had reared the ox, and grown the turnips with which to fatten him upon the land which he rented. It is rather a misfortune to agriculturists, that so great a misconception exists as to the capabilities of farming. In a pursuit liable, it is true, more than any other to the influence of seasons, and yet of such limited character as to be subjected to *yearly* production, limitation of quantity, and range of price, one would imagine that the conditions under which crops are produced would be so well defined, and so practically understood, that scarcely a diversity of opinion could exist upon the subject. But every one must have observed of late an evident desire on the part of many individuals sufficiently well informed, but who, having a political object to carry out, misleading the public upon the subject, or what is worse, by entirely misstating facts; apparent, it is true, to those interested, but to those unacquainted with the processes of farming becomes a delusion and a snare. There are gentlemen here, as I perceive, who will be ready to advance their opinions; but let me be excused reminding them that we ought to have no other object in view, but the advancement of agriculture, especially of the class

with which we are identified; that our object should be truth, and not disputation—that unanimity and good will should regulate our actions. I should be one of the last to disparage the attempts of others, however feeble, in pursuit of agriculture, having through a long life exerted myself in effecting that object by applying the utmost practical skill and knowledge I was possessed of, combined with such science as I have been able to obtain to effect it; but I confess I have of late been startled at the assertions put forth by certain persons, that, in proportion as prices diminish, exertions and outlay of capital should increase. It has always been a maxim long established and acted upon by the manufacturers that, as prices diminish, the cost of production must be also decreased; and that then, if the result should not be satisfactory, and profit could not be obtained, the manufacture should be diminished or suspended altogether, until demand, increasing proportionately as quantity diminished, a profit would be again the result. It must be self-evident, upon reflection, that if the inferior lands will be thrown out of cultivation from the effect of low prices, the better lands will yield but little profit; and, if increased production is to be the means of enabling us to overcome deficiency of price, then I am free to admit that for one I remain unconverted in opinion. No one will, I think, deny that the production of all extra quantity over an average produce will cost more per bushel to produce than each preceding bushel as we proceed. Assuming that a farm grows 28 bushels per acre under a fair and regular system of cultivation, and that at 50s. per qr. it just meets the expenses, and leaves a fair remunerative profit, we have in this case £8 15s. to meet probably £7 10s. actual outlay; but when prices of produce become diminished to 40s. per qr. on wheat, consequently 35s. more in value must be raised, and the land must be made to yield the difference over and above the expense of producing it; and granting this to be possible, no one will surely assert that the extra quantity of seven bushels required on each acre can be produced at the same cost per bushel as the 28 bushels per acre produced by a less expensive produce. I am quite sure I have your affirmative to the question, and therefore I think I shall have proved that unless the price shall be remunerative, the largest quantity cannot be extracted; and just as price diminishes, so must the cultivator necessarily diminish his appliances, and obtain that portion only that will repay his exertions to obtain. It was during the war that the agriculture of this country made rapid strides towards perfection. Prices justified the attempt, and it succeeded. Upon the renewal of peace, prices fell, and it relaxed until 1832, when a concurrence of good seasons and an increased demand produced energetic action, and the springs being tightened, once more were in full play; from 1840 a series of worse seasons ensued with worse crops. Currency was again depreciated. The panic that succeeded in 1847 again prostrated agriculture, commerce, and trade, and now competition with foreign countries brings down prices to such an extent as to compromise the success of every farmer; and unless in possession of a ge-

nial soil and a reduction of expenses, but little hope remains that increased exertions will surmount the difficulty that presents itself. Still he who maintains a good system, and is vigilant and active, will notwithstanding succeed best, and therefore I infer that steady application, with economy of expenditure, is at the present moment the only mode by which the tenant farmer can maintain his position in society. But with the same rent and charges, and increased expenditure, it will be impossible to succeed. As in trade so it is in farming; whenever profits become reduced, it is wise to limit transactions, and when losses occur to reduce them still further. None but gamblers pursue their object with increased energy as the risk becomes greater. I would not have ventured so far in giving an opinion, were it not that there is a spirit abroad inducing persons to invest capital in cultivating land without regard to amount, treating the subject as a question of figures only, that in proportion to the outlay such will be the increase. In certain departments of cultivation this may be true. If land has not been drained, or drained imperfectly, by all means drain it as quickly as possible. Deep cultivation, a copious application of manure, and production of green crops, are all highly beneficial; but the general improvement of the land will be better effected gradually, than by at once wasting a very large amount of capital. I of course speak with caution, but I speak practically; but if it can be shown that a certain return may be at once effected, then let a large amount of capital be at once invested; but until we have some brighter prospect of grain and meat realizing better prices, it will be well to first obtain a reduction of charges incident to cultivation, before capital is invested to any great extent in pursuing the object by contrary and opposite endeavours. It would appear, from the various opinions that are daily enunciated or published upon the profits of farming, that it was more mystical than practical. In a pursuit reduced to the production of one grain crop, and at most two grain crops, in one year, those crops easily estimated both as regards quantity and price, both of which are limited within a certain range, and with expenses of cultivation almost as easy a calculation, and more certain, than the amount of produce to be obtained—I say it is a matter of astonishment in the present age that so great diversity of opinion exists.

Mr. FORDHAM, of Newbury, said he had understood Mr. Baker to state a positive loss per acre.

Mr. BAKER intimated that that was the case.

Mr. FORDHAM thought they should take into consideration the profit on cattle, sheep, pigs, and so on, as well as the price of corn.

Mr. BAKER said it would be seen that he had allowed for all the produce, including the straw and the turnips. The turnips he had put down at 10s. per ton.

Mr. FORDHAM said that did not accord with his way of thinking.

Mr. BAKER said in that case he (Mr. Fordham) of course might state his views.

Mr. FORDHAM said the farmers in his own neighbourhood (near Newbury) were getting a very remunerating price for their sheep—he had not lost either by his

pigs; and he thought these things should be taken into account. With regard to farming generally, he thought a farmer should, in the present day, make the whole of his manure; he should buy no manure, except superphosphate, till times were better. He lived between two farmers who were proceeding precisely on the same system as Mr. Baker had done, and he knew they had excellent crops—9 sacks of wheat per acre, 14 of barley, and 90 bushels of oats per acre, and that upon a system which Mr. Baker said it was of no use trying; whereas in another quarter there were farmers who could not get more than 3 or 4 sacks of wheat under the old system of farming. He thought they should, as far as possible, endeavour to improve the system of agriculture. He knew that a profit could not be made without a rise in the price of corn (Hear, hear); but a farmer might now get a profit if he had capital enough to keep stock—not if he had a barren farm. Through the hill country in which he lived farmers had improved very much in the last two or three years: and they did consider that through the introduction of a better system, farming might pay them much better than it had hitherto done.

Mr. W. SHAW: Mr. Chairman and gentlemen, I think we are very much indebted to Mr. Baker for the pains which he has taken in placing this question before the Club (Hear, hear); and I for one regret extremely that upon an occasion when a subject was to be discussed involving matters of vital importance to the interests of farmers at the present moment, the attendance should be so scant (Hear, hear). Although I trust that I am not apt to be over-suspicious of my fellow-men, or of human nature generally, I do confess that my astonishment is considerably increased when I look round the room and, on the one hand, see wanting gentlemen whom I know to be such zealous advocates for high farming, while, on the other, I mark the absence of those who would have thrown light upon this question in its real merits had they attended here this evening (Hear, hear). I do not know that upon any previous occasion I have experienced so much disappointment as I do in finding that an occasion affording the opportunity of teaching the non-agricultural public what is the real position of the farmer, has been lost through the absence of those who were well qualified to embrace the opportunity of making the subject known to the country at large. On the other hand, I am not surprised at the absence of some gentlemen, who, I must say—and although, perhaps, the term is strong, it is not intended to be personal—have been for some time past in the habit of doing what I must describe as nothing more nor less than prostituting the term “high farming” (cheers). I am not surprised that they should have been absent this evening, and not have taken the opportunity of upholding here, where they would have met face to face practical men, those assertions and propositions they so boldly and so readily put forward throughout the country, to the benefit, perhaps, of a few, but to the prejudice of by far the greater portion of the agricultural community at the present time (Hear, hear). Gentlemen, in proceeding to make a few observations—and I shall not trespass at any length, feeling that I am not competent to deal with the subject

practically—I would advert to one or two points which have been remarked upon by my friend Mr. Baker, and upon which, supposing the same impression should have been made on the minds of others as has been made on my own, I am anxious that he should be set right, in order that no erroneous views may go forth to the public. I thought I collected, from the early part of his remarks, that he was of opinion that farming such as he described—that is, farming in the ordinary sense of the term—should be conducted entirely by the application of manures on the farm, without the use of external manures. I do not know whether I understood him rightly, but if that be his view I cannot concur in it.

MR. BAKER: No, I did not wish to state the matter thus. I made a comparison of the results of two systems.

MR. SHAW: Without advocating a wholesale application of external manures, I hold the opinion, and I think I am borne out by practice in declaring, that the application of external manures has been of the utmost advantage to farmers down to the present moment (Hear, hear). I believe that in a variety of circumstances and of soils the application of external or artificial manures has been the mainstay of the farmer, and has enabled him to cultivate his land to advantage when circumstances were such that it was otherwise impossible for him to cultivate advantageously to himself (Hear, hear). Hence, without advocating the application of external manures wholesale, I consider the use of them to be a great adjunct to the modern system of farming (Hear). Mr. Baker said he considered that an excess of manure might be prejudicial to the corn crop, but could not be so to the root crop. I quite agree with him that an excess may be prejudicial to the corn crop. But I do not stop there. I believe that the root crop may be forced beyond the advantageous point as well as the grain crop (Hear, hear). I believe there is a point at which you should stop in the application of manure to the root crop, and that by forcing it beyond that point through the application of manure, you deteriorate the character of the root (Hear, hear). Mr. Baker very judiciously and very pointedly remarked on one general principle which is understood with respect to the manufacture of meat by the use of grain, namely, that a bushel of grain will ordinarily produce a stone of meat, and that the profitable use of grain for that purpose is governed by the price of corn, inasmuch as if a stone of meat did not realize the price of a bushel of corn it would not be beneficially produced. Now I notice this for the purpose of pointing out the sophistry of one or two of our scientific farmers at the present moment. When grain is at a low price they vaunt their system of producing meat at a profit. We are told that pork can be produced at a certain price by feeding animals on grain, even on grain which has been purchased. It may be perfectly true that at the particular moment when grain is at such a low price that it will afford no profit to the grower, through giving grain as food meat may be produced at a profit; but that is an exceptional case; and yet this is one of the fallacies of which our scientific friends are in the habit of availing themselves when they wish to

establish the fact of their own superior management (Hear, hear). There is one deduction of our friend Mr. Baker which I am rather disposed to think will, when his paper goes before the public, be rather animadverted upon. He shews that with present prices the acre which he has so well worked out will produce, on an average of ten years, £9 12s. I am much disposed to think that he has been a great deal too liberal in that calculation; and I expect that we shall have some very pointed comments on that statement. It has been said that anything may be proved by figures: I have very little doubt that we shall have an array of figures with respect to that point. With regard to the progress of agriculture during the war, it is quite certain that in consequence of the operation of our currency system prices rose at that period so as to enable the farmers to make a profit; but I cannot agree with Mr. Baker if he thinks that since the war, until within the last year or two, farming has not progressed. I am one of those who are of opinion that notwithstanding the stimulus which farming received during the war, notwithstanding the vast number of enclosure acts passed during that period, and the vast quantity of land which was brought into cultivation, agriculture as a science has made much greater progress since the termination of the war than it ever did during or previous to that period (Hear, hear); and I feel perfectly convinced that in the economical conduct of the farming business, in the production of a given amount of meat from a given amount of food, and in the comparative number of bushels produced per acre—I am satisfied, I say, that, taking all the crops together, a comparison of the twenty years immediately after the war with the twenty immediately preceding its close, would be very favourable to the former, and that the period which has since elapsed has been still more productive. There may be differences of opinion, no doubt there are, on this subject; but upon one point there can be no difference of opinion, namely, that under the system which existed in this country up to the year 1846, the agriculture of this country fully kept pace with every branch of manufactures, as is evidenced by a comparison of the amount of food required by the people of this country and the average amount of foreign food imported. I think there can be nothing more conclusive than the simple fact that while the population has gone on rapidly increasing, the average importation of food has been so small. We need not stronger evidence than that to show that agriculture has progressed most advantageously to the country. With respect to high farming, I said just now that I considered that that term was absolutely prostituted by certain parties. I said that most advisedly. I have occasionally the satisfaction of seeing what has been done by those high farmers, who by the *soi-disant* high-farmers are not considered high farmers. Business called me last Friday into Cambridgeshire; and during four or five hours of the day I had an opportunity of looking at some of the best farmed land in that county and at the crops; and, having some trifling knowledge of a crop when I see it, I must say that when I reflected on the attempt of certain parties to lecture men, whose farms and crops I then saw, on their own

system of farming, it made my blood boil in my veins (Hear, hear). Not that I am undesirous of improvement, not that I am disposed to comment severely on the conduct of parties who may be anxious for improvement in agriculture; not that I would give credit to a man who knows nothing about farming, and censure those who would instruct him; but when I see crops which would beat the crops of these lecturers, and make them feel ashamed; when I know that these crops have been produced by men who have been bred farmers, and who cultivate their five or six hundred acres of land in the most superior manner, and when I hear men bruiting abroad their own scientific knowledge and their high-farming, I say that the course which is pursued is preposterous, it is unfair—I was going to use, but I will not, a stronger term—it is injurious to the country at large (cheers). Place things in their true light (Hear, hear). If there are those who are placed in favourable circumstances and yet do not farm well, lecture them if you please; but do not complain of the farmers of the United Kingdom as a class, when there are to be found in almost every parish persons who are fully competent to produce, and who do produce, far better crops upon a farm, and until lately at a better profit, than those who, having a long purse to go to, have, I am certain, been producing at a loss (Hear, hear). Gentlemen, I regret that we have not some of our really high-farming friends—some of those who are in the habit of attending here—to speak on this question, and to back up the practical observations of our friend Mr. Baker. But I have no hesitation in saying, that I could go into a dozen counties, and find hundreds of farmers who are, and have been, producing crops quite as large as any of which we have heard in point of quantity, and much more beneficially to themselves and the country at large, than has been the case with respect to crops produced by parties of whom we have heard so much, but of whom, I am quite sure, if they only progress for a sufficient length of time, we shall by-and-by hear very little (Hear, hear). I was very much surprised to hear the remark of our friend opposite (Mr. Fordham), that the farmers of his locality have lately begun to farm to advantage (Hear, hear, and laughter). They may have been making very great exertions—

MR. FORDHAM: I spoke of their having improved their farms to advantage, not of advantage to the pocket (Cries of "Oh, oh!")

MR. SHAW: After that I certainly will not make any comment. Gentlemen, I will not trespass any further on your attention. Not finding that any one rose immediately after Mr. Baker, I rose myself, rather, I confess, with the view of easing my mind of the annoyance which I feel daily at the lecturing which we get from parties professing high farming, but who really—I say it unhesitatingly—know nothing at all about the matter (Cheers and laughter). The press has lately produced a number of publications, pandering, I will say—for it is nothing less—to the interests of landlords (Hear, hear). I cannot believe that all this arises from disinterested motives, when I look at the results which accrue from these publications. I say that men who pro-

fess and propound the doctrine that farmers can at once, *per saltum*, change from a system which has been going on for many years, to one which is altogether new—that a man who has had capital sufficient to carry him on under the existing system, can at once change to an altogether new system without injury—the men who would persuade landed proprietors that a farmer can farm as well, and pay his labourers as well, and provide a subsistence for his family as well, with wheat at 40s., as he could when it was 56s., appear to me not to be honest men (Hear, hear). There is nothing in the history of farming which shows that farmers have, either in their personal enjoyments or in the money which they have been able to accumulate, been realizing the difference between 40s. and 56s. during the last fifteen or twenty years (Hear, hear). If a farmer can go on now and pay his rent, his taxes, and his labourers as he did before, besides providing for himself and his family, with wheat at 40s., one of two things is certainly true: he must either have been living most expensively when wheat was at 56s., or he must have been making a large fortune. Now, having lived from my boyhood amongst farmers, I must say that, with the exception of cases in which there has been some adjunct to farming—cases in which men have been agents of estates, or valuers, or have had some extra engagements which have paid them well, I have scarcely known an instance where a man has, in the ordinary course of farming, and by the mere investment of his capital in the soil, realized a large fortune (Hear, hear). There may be peculiar cases, for example, where a man has got an advantageous occupation on a long lease; but, regarding farming as a business, I do contend that it has paid as little as, if not less than, any of the other trades or occupations of the day (Hear, hear). Gentlemen, I have to apologize for troubling you with these remarks; but I was anxious to say something on the subject, and I trust that what I have said will be followed up by others.

THE CHAIRMAN said, before they proceeded further he was anxious to be set right with Mr. Fordham. It certainly had struck him as it had struck others, that what that gentleman said was, in effect, that the parties alluded to were proceeding in such a judicious manner that they were enabled to pay their way under present prices (Hear, hear). It was very important that nothing should emanate from that Club which was not perfectly correct. If Mr. Fordham were in a position to prove that any set of gentlemen in his district were, through judicious management and arrangement, enabled to pay their way, he was, of course, perfectly entitled to do so; but (continued the Chairman) on the other hand, I must say that what he appeared to state does not correspond with what I have witnessed in my own district for some time past (Hear, hear).

MR. FORDHAM: It would be impossible for me to assert what every practical farmer must know to be contrary to the truth, namely, that farmers are enabled to pay their way with present prices (Hear, hear). My assertion was, that the farmers of my neighbourhood were progressing in their business; that they were im-

proving in farming, not in selling the commodities of farming (Hear, hear).

Mr. NESBIT had understood Mr. Fordham to say that a profit was obtained by the judicious management of sheep.

The CHAIRMAN said he had understood him in the same manner. The general purport of the remarks appeared to be that, through judicious management in all departments, the farmers referred to were able to pay their way.

Mr. NESBIT said: There are one or two points in Mr. Baker's able paper to which I wish briefly to allude. First, with respect to the limits of production. Of course Mr. Baker used the phrase in a scientific sense. Now I think there are limits to production, and that on the best farms they are not very distant. As regards the corn crops, if you attempt to use nitrogenous manures too exclusively you will run a risk of throwing down the corn; and unless there are some means of keeping the crop standing, there is on most lands a very speedy limit to the production of corn. Experiments have proved that, by the aid of one or two substances, you may venture to a greater extent in manuring than you could otherwise. I speak here of the application of salt. If along with guano, or with a large quantity of farm-yard manure, there be an application of from 4 cwt. to 8 cwt. of salt, in the case of wheat, you will almost invariably find that it causes the straw to stand perfectly erect, while it allows unlimited action for the manure in producing the grain. You can, as Mr. Baker observed, apply manures to a much greater extent in the production of roots, and of such plants as clover and grasses, than in the growth of corn. These plants, having large foliage, act very powerfully upon the air, and are constantly bringing down a much greater quantity of nutriment than is brought down by narrow-leaved plants. Let me say a word or two with respect to the use of what Mr. Shaw has termed external manures. Now there are very few farmers who complain that they have too great a supply of manure, even when their green crops are fed off by sheep and bullocks. When such crops are produced by them to a great extent, there is generally room for the application of artificial manures in some shape. It has been stated to-night that it would not be prudent, because it would not pay, to introduce external manures. Now I say that if you are to farm at all it must pay to bring in these manures, under certain circumstances. In the first place, you have all the regular expenses of the farm: you have rent, tithe, labour; and if it can be proved that by the application of a certain amount of guano, or of nitrate of soda, you can increase the production of the crop so as more than to pay for the additional manure—I say if you can afford to farm at all you can afford to spend a certain amount of money in bringing these manures on the farm (Hear, hear). I know one or two parties who, through the judicious use of such manures, have hitherto managed to make farming not quite so losing a concern as it has been in other hands where minutiae have not been so carefully attended to. I ought to offer some defence for our friends who have been so much spoken against this evening. I must

say I do not think it is exactly fair to compare our young learners in farming with the oldest and best men who have been for years employed in practical farming.

Mr. SHAW: Why do they compare themselves with them? (Hear, hear.)

Mr. NESBIT: I say it is not fair on our part to compare them with such men as Mr. Hutley and Mr. Hudson. These parties have had to pay very dearly for the information which they have already acquired. They are not in a position to compete in farming with some of our best farmers, but at the same time they have been of material service in stirring up on every side a much greater regard for agriculture than was witnessed before. If landlords choose to deduce wrong conclusions from their premises, or if these men themselves deduce wrong conclusions, that is a fair ground of attack; but I think it is impossible to compare those who have been paying so much for their varied information with men of equal ability, great talent, and equal energy, who have had all the results of many years' experience to assist them. Probably Mr. Mechi's farming may, for a series of years, when he comes to debit himself with a fair rent, present some results which we have not yet seen (Hear, hear). I shall be happy to see the results of his farming when he charges himself with a fair rent, and places himself in the position of those practical men who are now contending against difficulties which would be apt to diminish the energy of any one but an Englishman.

Mr. SKELTON said: Mr. Shaw very properly alluded to the absence of some of the leaders amongst the high farmers. Whether they are right in assuming the position which they do, or whether they know more than the practical men who have also been referred to, this at least is certain, that the assumed high farmers have attacked the practical men, whom we know to be in reality high farmers (Hear, hear). I do not think, therefore, that the apology made by our friend Mr. Nesbit was called for or just. I concur in the remark of another speaker, that the credit of real, practical, and profitable high farming is due to those who have for a long time proved their ability in farming; and I do think that the attacks made by those upstarts, those mushroom men (laughter), who are going to enlighten all other men in farming, are most ridiculous; and I am very sorry that our friend Mr. Nesbit should have made any apology for such gentlemen (Hear, hear).

Mr. NESBIT said he had made an apology because he thought that one was required. Instead of comparing these mushroom farmers, as they had been termed, with the very *élite* of the farmers, they should compare them with the mass, or the average. If they did that, they would probably find that these men, though not competent to teach the best farmers, were superior to the mass.

Mr. KNIGHT said: As there are so few practical speakers present this evening, though I am not in the habit of speaking, I think it due to my friend Mr. Baker that I should make a few observations (Hear, hear). In the first place I would thank him for the manner in which he has brought the subject forward, although he has not, I must say, treated the subject in the precise form that I had expected he would. The

question is stated on the card as follows:—"Upon high farming, showing how and to what extent capital can be applied to a given quantity of land to ensure the greatest amount of profit." Now I did hope, when I entered this room, that my friend Mr. Baker would show me how, if I applied money to a certain quantity of land, I should derive profit from it (Hear, hear, and laughter). At the same time I thought it almost impossible that any profit could be gained with the prices which we are now realizing. I am not therefore, on the whole, disappointed. I could have wished that the question had been stated in this form—"Showing how it is possible, under the best management, for a person to gain a profit with present prices" (Hear, hear). Mr. Baker shows that it is impossible. He takes not quite a fair standard in taking the Essex one. And here I must say that I could wish that when our friend Mr. Baker makes observations on farming, he would let them have a general application, and not confine them entirely to his own county. I admit that there are excellent farms in that county, and I also admit that the expenses of farming are as high there as in almost any other county in the kingdom; but still the question should be considered in reference to other counties as well as Essex. I know that in Bedfordshire, Norfolk, and other counties, farming is carried out on a different plan; and I hope that Essex and Suffolk will not always be the sole counties alluded to. I wish the statement or implied statement on the card could have been verified. It would have been satisfactory to myself, and no doubt to the country generally. Notwithstanding, however, that Mr. Baker has failed in that respect, I thank him for what he has done to assist, as he is in the habit of doing, the tenant farmers of this country in arriving at just conclusions (Hear, hear).

Mr. TATTERSALL said: I certainly did expect, after reading the question on the card, that we should have seen here this evening some of those who are called the "new lights" of the present day—our friend Mr. Mechi and other gentlemen holding similar views; and also that we should have been addressed by some leading gentlemen belonging to the club, on the other side; but as these gentlemen are not present, perhaps it will not be considered presumptuous in myself to make a few observations. I think the question under discussion ought to be looked upon as a question between high farming and low farming—whether high farming, as contradistinguished from low farming, will pay. Not that I mean to assume for a moment that high farming will pay with present prices; but that is not, I conceive, the question raised on this paper. What we ought to discuss is, I think, whether high farming, if properly carried out, will pay better than ordinary farming. I have for some years been living in a county where high farming has been carried out to as great an extent as in any county in England. I take the counties of Norfolk, Suffolk, Essex, and Cambridge; and I say that in those counties high farming is carried out as beneficially as it can be, or is, in any county in England. I find that business-like men who carry out high farming are those men who can compete best with others at the present time. I need not mention

names, for they will suggest themselves to you; but I say, as a matter of principle, that if any farming pays at the present time high farming pays. Mr. Baker has very properly put before us the difference between high-farming and farming on the common system; but I think it should be distinctly understood by all, that high-farming, when carried out by business-like men, such as the Messrs. Hudson, Hutley, Jonas, Hobbs, and Webb, gives the greatest return in the present day. These are men who have been carrying on farming all their lives, and they are men against whom the keenest wits of the new school would be pitted in vain. We have seen them carrying out high farming beneficially to themselves and to those around them. Men, carrying out their views as they have done, will beat out of the field such men as Mr. Mechi. Now I say that high farming, as a rule, pays the best; I see it pay the best wherever I go. The men who must sink under the influence of the present times are the men who, having but little capital, are not able to carry out high farming to any considerable extent; but I do not see that men who have sufficient capital to carry out high farming will be obliged to retire. I do not mean to say that even they are gaining anything at the present time, but it is they who are most competent to contend against difficulties like the present, which are, I hope, only temporary, at least they are by many considered temporary. With regard to high farming, I may observe that I believe the use of various kinds of artificial manure has been greater in the past year than in any previous one, which seems to indicate an extension of the opinion that high farming is the best; at all events, I for one am decidedly of opinion that under any circumstances high farming is more beneficial than farming in the ordinary way. But I would further observe that I do not think it is to be expected that high farming will be carried out to the full extent unless landlords give either leases, or, what is equivalent to leases, a proper covenant (Hear, hear). Men in their senses cannot be expected to carry out high farming, unless they have that without which farming cannot be advantageously carried on, namely, security of tenure. I look to security of tenure as that on which the carrying out of high farming profitably depends; assuming, first of all, that high farming is the only kind of farming which can pay in the present day.

The CHAIRMAN said: I hope my friend Mr. Baker will excuse my saying that I think we should have been more likely to come to a sound conclusion if the question had been worded somewhat differently. It would have been better, I think, if, instead of attempting to show us how to insure the greatest possible profit, he had shown us how to avoid the least possible amount of losses (Hear, hear). That is the question which we should have understood best in our present position as farmers (Hear, hear). I do not say this by way of objecting, but I think we should, in the way that I have stated, have got more easily at the fact (Hear, hear). I am one of those who fancy that neither by high farming nor by low farming can we get any profit at the present time. If that be so, the question, as stated, is rather opposed to the facts; and, under all the circum-

stances, I think we shall merely come to the conclusion that the system which Mr. Baker has recommended for the adoption of farmers generally is one which will enable them to farm with a less degree of loss than any other. Many remarks of a practical nature have been made by Mr. Baker, which cannot be too strongly impressed on a meeting like the present. I would first notice his recommendation as to spouting the farm buildings, covering the manure heaps with turf, and so on. Those are plans which have been adopted in my county very extensively. I never think of carrying manure on my own farm without covering it with earth the next day to prevent the ammonia from escaping. That is a plan which cannot be recommended too strongly. Mr. Baker also alluded to the cutting up of tares into chaff. We have been doing that for years. If we suffer our rye and tares to grow too strongly, we find that we have got too far advanced in the season to compete successfully with turnips. I don't think anything can be more injurious to the land than rye, if it be allowed to get beyond a given state. Our land is all manured for rye and tares, and, generally speaking, I have found crops very precarious after tares. I should like to hear from Mr. Baker whether the twelve loads of manure were produced under the four-course system.

MR. BAKER: Twelve loads per acre per annum upon the whole farm. I explained at the outset that it was equivalent to twelve. There is a detailed statement respecting it.

THE CHAIRMAN: Mr. Baker recommends the cutting down of large fences. I do not think anything requires more to be pressed on the attention of landlords than that. Nothing damages a farm more than the keeping up of a large quantity of hedge-row timber (Hear, hear). The injury is almost incalculable (Hear, hear). It is monstrous that so much hedge-row timber should be allowed to remain when the injury it does is so great (Hear, hear). I understood Mr. Baker to say that you could better wheat after oats than any other crop.

MR. BAKER: On my land.

THE CHAIRMAN: You don't mean better wheat after fallow?

MR. BAKER: No; I mean that I can better wheat after oats than oats after wheat.

MR. TATTERSALL: What is the nature of the soil?

MR. BAKER: It is a gravelly soil, rather too heavy for feeding off turnips.

MR. BAKER replied. He said Mr. Shaw was right with regard to the figures. Of course what he had said on the subject of the result had reference to the relative prices of 56s. and 40s. As regarded artificial manures, he would never dispute for a moment that the application of a liberal quantity of manure was beneficial. In considering this statement it should be recollected that agriculturists had not had guano at their command for more than two-thirds of the period of ten years. His intention was to show what had been the result of high farming. Whatever might be Mr. Tattersall's opinion as to high farming in the counties which he had mentioned, it was impossible to show a greater production than there had been in the case which he (Mr. Baker)

had brought under their notice. The land of which he had spoken was a portion of a small farm close to the home stall; he had bestowed great attention on it, and had made its cultivation a pleasurable pursuit, doing all for it that could be done for land so situated. He had shown what was the utmost amount of production under the circumstances. He had shown a very liberal management—a management under which £10 per acre was expended, with a result of £13 per acre under late prices. He knew of no mode of proceeding so likely to be effectual as the application of the means to the end which was made by the farmers of the district in which he lived. He had stated the facts connected with his own case, and he left farmers to draw their own conclusions. He was quite satisfied as to which kind of farming would pay the best. He was convinced that if at the present time farmers did not cultivate well they would farm at a great loss. Even with good cultivation there must be a loss under present prices, but the loss would be much greater with indifferent farming.

MR. TATTERSALL said he had felt quite sure that Mr. Baker and himself thought alike on that point.

MR. BAKER said, of course on such a question he had felt some difficulty in preparing to come before the meeting. He confessed that he had never experienced so much difficulty before. If his task had been to show that their greatest profit arose from high farming, he must have entered into the different systems of farming in different counties. The object of the inquiry was to show how much could be realized. He had to show how much could be realized when a given amount was expended, and what proportion the one bore to the other. He had no doubt that when his statement should appear in print there would be some hard hitting on the part of the scientifics (laughter). Though they had not been there that evening, they would no doubt pounce upon him very shortly. He would draw them out (Hear, hear). So long as they remained in the bush it was impossible to deal with them (Hear, hear, and laughter). These gentlemen gave them elaborate statements of their expenditure, but when the balance-sheet had to be talked about they never made their appearance (Hear, hear). If farming was to be practically carried out it must be carried out beneficially to the farmer. Every man who farmed extensively did so in order to obtain a profit by his exertions—to obtain a return for his capital, a livelihood for his family and for himself, and to make a proper provision for old age. Any person possessing adequate capital might expend money on land *ad libitum*, and like the guano when he purchased it, mix it with the land; but the question was, how to collect it again (Hear, hear). He had ventured on some occasions when farms had fallen into his hands to bring them into something like tenatable condition; but he had never succeeded in doing so without frightening the landlord. There was great expense always attending the bringing of heavy land into proper cultivation: he knew one farm of that description in his own county which was formerly let for 1,000 guineas a year: it was in the hands of a gentleman who came into the county, with plenty of capital, science, and skill, but who

lost all that he invested. The landlord then took the farm into his own hands; he farmed it one year and lost two rents, a second and lost nearly the same. He then took counsel and let the farm, which had before fetched one thousand guineas, for £400 a year. Of course the person who took it at that price, with all the improvements which had been made, realized a considerable profit. It was afterwards let at £600 a year. This case was an illustration of the fact that when land was out of cultivation it was very difficult to bring it into a proper state.

Mr. NESBIT said the whole argument of Mr. Baker proceeded on the supposition that no rent at all could be obtained.

Mr. BAKER said he had spoken comparatively: he meant to say that no profit could be got.

Mr. SHAW said they were well aware that it was the practice of this club to come to some conclusion with regard to the various questions which were discussed;

but on that occasion there was great difficulty in doing so, on account of the necessity of steering clear of another question on which there might be great difference of opinion. The resolution which he would propose, with a view of meeting the case, was as follows: "That high farming has long been practised by the most experienced and intelligent practical farmers where they have enjoyed security of tenure, and is essential to success; but that the extent to which capital can be applied to a given quantity of land, to insure a profit, must depend on the relative proportion of the cost of production to the market value of agricultural produce."

After a short conversation, the resolution was adopted unanimously.

On the motion of Mr. Knight, seconded by Mr. Shaw, a vote of thanks was given to Mr. Baker for the able manner in which he had introduced the question.

This terminated the proceedings.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(From the Morning Chronicle.)

THE FISHERIES AND THE FISHERS OF CORNWALL.

LETTER X.

Although, strictly speaking, not falling within the compass of an inquiry into the condition of the agricultural labourer, I propose, before quitting Cornwall, to give a brief account of its fishing and mining interests, and of those employed in connection with them; as, otherwise, the sketch of the industry of the county would be incomplete, seeing that it cannot with propriety be classed either with the manufacturing or the metropolitan districts. In doing so, I shall first consider the fisheries of the county, and the circumstances of those engaged in them.

Cornwall was celebrated for its mineral wealth long before it attained any very great celebrity in connection with its fisheries. For the last three centuries, however, the latter have been plied with unwearied assiduity and varying success. This, like all the other great branches of our industry, was, early after developing itself, taken under the fostering care of the legislature; but it may be reasonably doubted, looking back at its legislative history, whether the interest sought to be thus advanced was not more injured than benefited by the interference. To this day the fishing of the county is strictly regulated by parliamentary enactment; but the regulations to which it is now subjected have reference more to the practice of fishing itself than to the trade in fish, in its economical aspect.

The chief fisheries of the south and west of England are undoubtedly those of Cornwall. The only two ports on the English Channel which can at all compete, as fishing stations, with the Cornish ports are Brighton and Plymouth. The fishermen of Sussex, Devon, and Cornwall, all sweep the entire channel for fish—the Brighton and Plymouth boats

being sometimes seen on the Cornish coasts, and the Cornish boats far more frequently seen off the shores of Devon and Sussex. The most hardy, adventurous, and scientific fishers of the south are those of Cornwall. They do not confine themselves to their own stations, but proceed to great distances in prosecution of their vocation—the Brighton fishermen, perhaps, coming next to them in hardihood and adventure. They not only frequently proceed more than thirty miles to sea in quest of fish, but they compete even with the Irish fishers on their own coasts, and have been known to pass through the Caledonian canal, and descend the east coast of Scotland and England in pursuit of the herring.

But a short time ago the fisheries of Cornwall embraced the entire coast of the county, and extended in an unbroken line from Lundy Island, round the Land's End, to the Rame Head. But this is no longer the case, the fishing interest of the north coast having become almost extinct from the uncertain movements and capricious habits of the fish. As on all other points of the coast of the United Kingdom, where fishing is plied as a distinct vocation, the habits of the shoals of fish which annually visit the shores of Cornwall have greatly changed within the memory of living man. But a few years ago the pilchard used regularly to ascend the Bristol Channel as far as Lundy Island, whence they would strike off towards Milford, and thence across St. George's Channel in the direction of Waterford. But for some time past they have shown no preference for the estuary of the Severn, seldom ascending now much higher than St. Ives, and striking thence across to the Welsh and Irish

coasts as before. The consequence has been the ruin of the small fishing communities which extended from St. Ives to Lundy Island. Some of them yet exhibit faint symptoms of fitful and galvanic life, but most of them are perfect wrecks—the ruin entailed upon them having been not only disastrous to themselves, but also most injurious to the interests of the agricultural labourer in the immediate vicinity of each. The fisheries of Cornwall may, therefore, now be regarded as confined to that portion of the coast which extends from the Rame Head, round the Land's End, to St. Ives—that is to say, to the whole southern, and a small part of the northern, coast of the county. St. Ives is now the chief fishing station on the north, and Mount's Bay that on the south. On this latter coast there are many other stations, differing from each other in magnitude and importance—such as Falmouth, Mevagissey, Charlestown, Towey, Polperro, and Looe. Along the shore of Mount's Bay, which stretches from the Lizard Point nearly to the Land's End, are several fishing communities, the chief of which are Newlyn and Mousehole. They are all, however, comprehended under the common designation of the Mount's Bay fisheries.

Cod, hake, ling, and congor are caught in considerable quantities off the Cornish coast, but the mackerel and the pilchard are the great source of the fishing industry of the county. Although these are the chief products of the fisheries of Cornwall, they are not the sole objects of a Cornish fisherman's exertions. When he cannot fish on his own coast for the fish frequenting it, he is off to the Irish, and sometimes to the Scotch coast, in search of the herring. The herring fishing, therefore, although the herring is not strictly a Cornish fish, must be included in the annual routine of a Cornish fisherman's vocation.

There are three kinds of fishing practised in Cornwall—the drift-net fishing, the seine or sean fishing, and that by hook and line. Both mackerel and pilchard are caught by the drift nets, whilst pilchard alone is generally the object of the seine fishing. When the hook and line are used, it is cod, hake, ling, or whiting that is generally caught. For each species of fishing a distinct set of boats is used. The longest and best boats are those employed in the drift-net fishing, the smallest are those used for that by hook and line, seine fishing being carried on by an intermediate class of boats. The hook and line fishing is generally abandoned to men with but little capital, or to those who are unfitted for the other and more arduous branches of the calling. The hook and line, too, are not unfrequently resorted to by the drift-net fishermen, when, from the absence of the pilchard or mackerel, or other unfavourable circumstances, but few fish are meshed in the nets.

In order that the reader may properly understand the life and labours of a Cornish fisherman, I shall now—having taken, as it were, a bird's-eye view of the fisheries and of the modes in which they are plied—describe it briefly to him, commencing with the month of January, and ending with that of December.

The fish which earliest in the year engages the fisherman's attention is the mackerel, which, in its

annual migration, comes first within the rather wide scene of his operations in the month of January. But before following him to his first fishing ground for the season, it may be as well here to describe his boat, and the other appliances of his calling.

The boats employed for the capture of the mackerel are the drift-net boats already alluded to.

They are the largest, the most commodious, and the best built of the fishing fleet of Cornwall. From a slight peculiarity in their build, and their close resemblance to each other, they are generally at once recognized whenever they appear off the coast. This is more especially the case with the Mount's Bay boats, which have so strong a family likeness pervading them as to render it next to impossible to mistake them. They are great pets, not only with their owners, but also with those who join in the adventure and man them. A Mount's Bay fisherman will wax as eloquent on the good points of his boat as a huntsman will on the virtues of his horse. The total number of boats connected with the fisheries of Mount's Bay is from 250 to 300; nine-tenths of which may be taken as engaged in the drift-net fishing. They are chiefly built of oak, sometimes of elm, and average from 20 to 22 tons burden. The drift-net boats are divided into two classes, determined by their dimensions and capacity. The first class boats have a length of keel of from 30 to 35 feet, and a breadth of beam of from 7 to 12 feet. They are sharp at both ends, but are generally very wide at midships. The ballast, which is usually of stone, is stowed away beneath a low deck, or rather a kind of flooring for the boat. The Mount's Bay boats are now almost all partially decked, having a cabin both fore and aft, in which the men can eat and sleep, and a covered chamber between the masts, in which the nets are stowed away until they are called into use. Some of them by simply covering a large hatchway in the middle, can be rendered full-decked at once in case of necessity, which is a great safeguard to them in rough weather. It is not many years since the fisherman's lot was less comfortable on board his boat than it is now. A short time ago, but few of them were provided with any cabin at all. The men were then subject to very great privations, from their constant exposure to the weather. With the exception of the sail or the tarpaulin, in which they might wrap themselves, they had no shelter whatever from the wind and rain. In Mount's Bay this has been rectified; but the improvement has not very generally extended itself. The smaller boats used at other fishing stations, such as Mevagissey, Looe, and Polperro, are very seldom even partially decked. The fishermen of these places are therefore subjected to much greater privations than their more fortunate, because more provident, brethren of the west. In some of the boats provided with cabins there are fixed berths for the men to sleep in; whilst in others the cabins are sufficiently large to admit of the hanging of hammocks. Considering his frequent and long exposures to the weather, especially during the winter fisheries, a great step towards the preservation of his health and the general amelioration of his lot has been taken, in simply providing him with a covering to shelter him whilst

he sleeps. The boats have generally two masts—a fore and mizen mast. Their sails consist of a fore and mizen lug sail, two top sails, a jib and fore sail. Their sails are very large, some of them containing from 130 to 150 yards of canvass. By carrying several sets of sails they are provided against ordinary accidents. When in trim for sea their draft is about two feet more astern than at the bow. They generally draw about five feet ast, and not more than three in front. In building these boats every effort is made to endow them with good sailing attributes. As a general rule they sail best on a wind. The fishermen have an important object to secure in having them constructed to sail well, particularly in the summer time, when it is especially necessary to get the fish caught early to market, as any great delay would impair their freshness, and materially lower their value. The model of his boat is therefore always a matter of great solicitude to the fisherman. In addition to this, with a view to speed, he resorts in Mount's Bay to a practice not very generally known or imitated in the other fishing ports of the country. When he overhauls his boats for a change of fishing, he besmears the bottom with a coating of blacklead, which, he believes, preserves unimpaired its sailing powers, by preventing the rapid accumulation of seaweed and dirt on her hull, which would otherwise take place and clog her speed. The boats differ in price according to their class. For boats of the same class, however, the same price is generally paid. A first-class boat will cost, ready for sea, about £180. The price of a second-class one is about £120. This is, of course, in both cases exclusive of nets and other appliances. But as a man may save money by buying the cloth for his coat, so may a fisherman by buying the wood for his boat, particularly if he can give ready cash for his materials. In that case he might get a first-class boat ready for sea, for £140, the hull alone costing about £80. But of course if he gets credit, which is generally the case, and orders his boat without himself providing the materials, the prices first mentioned are those which he will have to pay, according to its class. The boats are owned in different ways. A few of the wealthier fishermen have a couple of them; but the majority have only one. In some cases the boat is subject to a joint-ownership—two, three, or four, as the case may be, having an interest in her. In other cases the boat may belong to one or more parties, whilst the nets, &c., appertain to others. There are others, again, who have no share either in the boats or nets, their only capital being their labour. A boat's crew may thus consist of the owner or owners of the boat, the owner or owners of the nets, and those who have only their labour to bring to the adventure, which is thus a species of co-partnership for the time being, each partner's share of the proceeds being determined, of course, by the amount of his interest.

But the possession of the boat, whether owned by one or more, is only half the battle. Other and equally expensive appliances are necessary, which I shall now proceed to explain.

The boat is, of course, imperfect without its complement of nets. These, as already seen, are not always the property of the owner or owners of

the boat, for the boat and nets may belong to different individuals, or sets of individuals. This is often the case, the nets being so expensive that it requires a fisherman to be a man of some considerable capital to have both boat and nets exclusively his own. A few have not only one but two boats, with their full complement of nets.

The nets used by the Mount's Bay fishermen are generally made in the port whence the boat sails. Sometimes the men themselves, when they have nothing else to do, employ themselves in constructing them; but this is a task which is generally left to the women and children to perform. The twine of which the nets are made is in almost all cases procured at Bridport, in Dorsetshire. In general it is very soft, but not fine. The fisherman receives it in what are called "parcels," each parcel containing twelve large skeins, for which he pays about 13s.; the price, however, depending to some extent on the nature of the transaction, as to whether it is a cash or a credit one. The nets are made as it were in sections. It requires seven parcels of twine to make a pilchard or herring net. Four of the smallest sections, when put together, form a net which usually goes under the designation of a piece-of-four. A complete net, as actually used in fishing, for a first-class boat, consists of fifteen of these pieces-of-four. The makers of the nets are generally termed by the fishermen the "breeders." As they come from the breeder's hands each piece-of-four is from fifty to sixty fathoms long; but they have afterwards to undergo an operation to prepare them for service, which causes them to shrink considerably. In addition to this, they are, when actually used, so put upon the "head ropes," that their length is diminished to about 36 or 38 fathoms. In depth the nets vary from 13 to 15 score meshes, there being about ten meshes to each foot, which will make them from 26 to 30 feet deep. A set of nets, therefore, in actual fishing order would in length extend to about 600 fathoms, or somewhat more than two-thirds of a mile. In general the nets are "home made"—that is to say, at the house of the fisherman for whom they are made. The wages given for making them are very low, which chiefly prevents the men, even when they have spare time on their hands, from frequently employing themselves in their construction. Sometimes they are made by the wife or daughters of the fisherman, when of course the wages which would otherwise be paid for them are saved. At other times, girls and children are hired for the purpose. A girl if she works early and late can work off about two skeins a day. In doing so her fingers fly about as nimbly as do those of a lace worker over her cushion. Her remuneration is one shilling a week and her food. Sometimes, however, the nets are "put out" to be made, when the "breeder" gets £1 per net, in which case food is not included. When the work is thus given out by the piece, as many as three skeins a day are sometimes worked up; but this requires extraordinary exertions, which could not be long continued. The entire cost of a piece-of-four is about £8. The twine alone costs about £4 11s. There is then the cost of making and of barking, and the expense of the cork and head ropes required. A complete net, therefore, consisting of

fifteen pieces-of-four, will cost about £120. The same nets are generally used both for the pilchard and the herring fishing; but some boats are provided with different sets of nets for each. For herring, the law requires a larger mesh than for pilchard fishing. When there is but one set of nets for the two fisheries, the mesh is generally the smallest allowed by law for the capture of the herring. Of this mesh there are about ten and a-half to the foot. This, which is the smallest for herring, is about the largest used for the pilchard. The consequence therefore of having but one set of nets is, that some loss is experienced in both fisheries, for whilst the larger herrings do not get meshed, the smaller pilchards escape through the meshes. Until recently, the fisherman was subjected to a large yearly outlay for barking his nets. To preserve them from decay, and keep them in good working order, they were generally barked four times a year. The barking of a set of nets for the season, then, costs the fisherman about £11 4s. In addition to this, the process entailed upon him, on the average, a loss of from four to six days' fishing. But by the use of catechu instead of oak-bark, a saving, both as to time and money, has been effected. The nets are now overhauled but twice a year, at a cost of about £1 each time. It is strange that notwithstanding this great saving the oak-bark should still be used at many of the fishing stations. At Mount's Bay it is now universally superseded by the catechu, which was at first looked upon, even there, with some suspicion; so slow is the progress of improvement, even when men's interests would be directly subserved by advancing it. The length of time for which a set of nets will last, depends upon a variety of circumstances. If the twine is good, and they are well barked, and kept carefully dry when not in use, they will last for a considerable time. Their endurance greatly depends, too, upon their owner's success in fishing. If that is great and constant, his nets will all the more often require repair, as well as more frequently require to be renewed. They generally last, however, from four to seven years.

The nets are not in all cases made at the stations where they are used. But few, for instance, are made either at Looe, Polperro, Fowey, Charlestown, or Mevagissey. This is to be regretted, for the sake of these communities themselves, inasmuch as they swarm with idlers, who might be thus usefully employed. But they prefer getting their nets ready made from Bridport. The women and children have thus little or no employment wherewith to fill up the time on their hands.

I have hitherto spoken only of the nets used for the capture of pilchard and herring. But the observations made with respect to them apply, with but few exceptions, to the mackerel nets. These are generally longer when in actual use than the herring or pilchard's nets. A complete set for a first-class boat generally consists of twenty-eight pieces-of-four—each piece-of-four when fit for use, measuring about thirty-two fathoms in length, and about three in depth. A mackerel net will thus be about a mile long. The mesh, when the net comes from the "breeder's" hands is about an inch and a-half in size, but it is reduced to nearly an inch

and a-quarter by the use of the catechu. These nets last about the same length of time as the other; although, from the frequency with which they are in use, they require more constant repair.

The seine nets are made with a much smaller mesh than either of the nets alluded to. The reason of this will be obvious when the process of seine-fishing comes to be described.

Being prepared with all the appliances of his craft, it is now time to follow the fisherman in pursuit of his prey. The mackerel first calls him from his home, and it is often the last fish to engage him during the year. This fish is on the Cornish coast more or less throughout the whole year; but as it frequently varies its position the fisherman must dance attendance upon it at different points of the coast. During the winter months the course of the mackerel is generally up the Channel, which they sometimes ascend as far as Brighton, and more frequently as far as the Isle of Wight. But as a general rule they do not ascend in great masses much beyond the Devonshire coasts. Until the advance of spring they keep in deep water at a considerable distance from the shore; as spring approaches, they change their course, and tend towards the westward, in doing which they come nearer the shore, and rise to the surface. It is then that the fisherman deems it time to commence his operations.

As at this period they are to be found in the greatest quantity on the coast of Devon, the Cornish boats sail eastward to Plymouth, where they meet the Brighton boats, which hie westward to the same point. They annually meet at their common rendezvous, Plymouth Sound, about the end of January. The Cornish boats, particularly those from Mount's Bay, are generally first on the ground ready for action. Both they and the Brighton boats are frequently at work before the Plymouth fishermen themselves are ready to begin. It often happens, therefore, that the Plymouth market is for some time supplied by the Brighton and Cornish boats. It is seldom that any preparations are now made for the spring mackerel fishing until some time in January, although the Mount's Bay boats have been known to be off for Plymouth before Christmas.

There are three mackerel seasons throughout the year—the spring, summer, and autumnal seasons. In prosecuting the spring and autumnal fisheries the drift nets only are used. During the summer months when the fish approach the shore, and get into shallow water to deposit their spawn, they are caught in considerable quantities by the seine. But this fishing is very irregular. The mackerel is also sometimes caught by the hook and line, but in such small quantities as scarcely to entitle this mode of capture to be regarded as a distinct branch of the fishing of the county.

By far the most important branch of the mackerel fishing is that carried on with drift nets. The seine fishing is limited in duration, and so frequently fails, that it is to the drift nets the different markets of the south-west have chiefly to look for their supplies.

The number of boats in Mount's Bay that engages in the mackerel fishing is from 150 to 200.

After having been thoroughly overhauled during the previous December, they are afloat and ready for action early in January. Nothing can be finer than the sight of the Mount's Bay fishing fleet when equipped and ready for sea. The number of hands to a boat does not vary much, although there is considerable variety as regards their ages and capacities. Some boats have seven men and a boy on board; others carry seven men without a boy; and others again but seven in all including a boy. In most of them a boy is to be found, who, although he may take no active part in the fishing, is nevertheless exceedingly useful on board for many purposes, cooking included. He is thus early inured to the undoubted hardships of the life which, in all probability, he will ever afterwards follow. The men go on board well and warmly clad, and frequently with a complete change of dress. His enormous boots form an expensive as well as a prominent item in the fisherman's attire. The poor fellows have generally their names marked upon the breast of their Jersey jackets, so that they may be recognised in case of any casualty. It is but a short time since some were washed ashore at Polperro who could only have been thus identified by their friends. I asked my informant if they lost many at that port? "No," said he, "they're seldom lost; they're generally washed up some time or other at the point there."

The men never take spirits nor even malt liquor on board with them. Their commissariat generally consists of bread, sometimes potatoes, tea, and coffee, a little salt meat, and a supply of fresh water. Thus provided, they set off in January in their small but seaworthy craft for the mackerel fishing off Plymouth Sound.

They generally manage to arrive at the fishing ground a little before sunset. At sunset the boats are permitted to drive or float, as it were, at random, during which time the nets are being heaved overboard, generally from the right quarter of the boat, the object being, if possible, to throw them across the tide. The nets all overboard soon assume a perpendicular position in the water, the whole being kept close to the surface by the large and buoyant corks attached to their upper edge. It is different in the pilchard fishing, the nets being suffered to drop some distance below the surface, but still hanging perpendicularly in the water. When the nets are all let out, the drift rope attached to the head of them is given out for some length, after which it is carried forward and secured to the bow of the boat, which thus rides to the nets as if at anchor, and keeps them constantly on the stretch. Things being in this state, the men proceed to prepare their supper. As they always carry a portable cooking apparatus, they have hot tea or coffee always for breakfast and supper, and, such as choose, for dinner also. This, with bread, salt meat, and fresh fish, forms their chief fare. They renew their stock of provisions every time that it is necessary to do so, when they are ashore disposing of their fish. Supper being over, the first watch is set for the night, the rest of the crew retiring to rest. At midnight they are called up, and if the watch can report symptoms of a good "take," the nets are then hauled in. If not, the first watch retires to sleep, leaving the

second on duty till four o'clock in the morning, when they are called, and the nets almost invariably hauled in. This is done by moving the drift rope to the right quarter, over which the nets are hauled. If the fish caught are in moderate quantity, they are taken out of the net as it is being drawn. If in great quantity, and the fishing is near the shore, the fish are left in the meshes, and the net drawn as soon as possible, lest it should ground. The fish are in this case detached from the net when the boat gets ashore. When the demand for fish is great in Plymouth, and the price consequently good, the boats may not come ashore for a week or more at a time, the price being sufficient to induce others to visit them in light sailing trawls, who purchase their fish from them, and sell them ashore. About Mount's Bay it is customary for the boats to land every morning with their fish, which is disposed of to the "jowsters"—a set of middlemen, as it were, between the producers and consumers, who transmit the fish to Bristol, or hawk them about the country in carts. These hawkers or jowsters visit almost all the fishing ports, coming frequently all the way from Launceston to Polperro and Looe to purchase fish. Saturday is the only working day on which they do not make their appearance, when fish is exceedingly cheap at the ports, whiting frequently selling for one halfpenny a pound. When the fishing is being carried on off the Scilly Islands or in St. George's Channel, and the daily access to market is rendered impossible, another plan is hit upon for the disposal of the fish. Eight or nine boats then act in concert, one being made the messenger for all the rest, and conveying the fish of all to market. The boats take this duty in rotation. The period of their absence depends upon the distance of the market, but it varies from two to four days. The boat which is thus absent disposing of the fish is entitled on its return to an equal share of what the others have caught in the meantime. Sometimes on reaching a market, the messenger boat finds it overstocked; in which case another market is if possible sought without delay; when reached, it also may be found overstocked, or by the time it is reached the fish may be unfit for sale, and has to be thrown away. This is not during some seasons an unfrequent occurrence.

The division of profits is generally made as follows:—One-seventh of the proceeds is laid aside for the boat; the remainder is divided into two equal parts, one of which is appropriated to the nets, the other being divided amongst the men, share and share alike. If there is a boy on board he is entitled to half a man's share. If the owner of the boat, or of the nets, is on board, he is entitled to his share as one of the crew, in addition to what is appropriated to the boat or nets: this appropriation is made with a view to keeping them in working order, and of returning a fair per centage upon their original cost.

The mackerel fishing is liable to great fluctuations, its success depending upon a great variety of circumstances. Sometimes, for instance, the fish may pass up or down near mid channel, at other times near shore, sometimes near the surface, and at others in deep water. It may thus be that the fishing may be plied for days with dis-

couraging results, owing to ignorance of the position of the fish. Sometimes a very slight change of position makes all the difference in this respect.

The mackerel fishing off Plymouth Sound lasts for about six weeks, the fish taking then a westerly direction. They are pursued by the Cornish boats, particularly those of Mount's Bay, off which the fishing is pursued with great industry for about six weeks more.

Formerly a lull used to take place from about the middle of May to the middle of July, in the active routine of a fisherman's life. To the great bulk of the drift-net men this time was wholly lost; the only fishing which could be plied, and that for only part of the time, being the precarious one of seining the mackerel, and few of them having any interest in seines. But now this is all changed, and the two months which used to be lost are at present to the fisherman the most active, adventurous, and sometimes the most profitable of the year. As soon as the mackerel fishing is over for the spring and summer, he begins to prepare for the herring fishing. In doing so the nets are closely looked to and repaired, and the boat is thoroughly overhauled; for in prosecuting this branch of his vocation he has to change the scene, and frequently goes to a great distance. About the middle of June all is prepared, and the great bulk of the Mount's Bay boats repair to the Irish Sea and the north coast of Ireland; most of them make Howth their head-quarters. The herring fishery thus prosecuted is not so much a Cornish fishery as an occupation for Cornish fishermen—and that, too, at a period of the year when they would not otherwise be employed. The value of this adventurous episode in the annual routine of their exertions may be inferred from the fact that they have sometimes carried back with them from seven to ten thousand Pounds into Mount's Bay alone. This I had from a gentleman well known in Cornwall, and connected with a bank through which most of the money passed. It was about 1820 that Cornwall sent its first fishing expedition to the Irish coast. So encouraging were the results of the first experiment, that it has since been repeated every year, and is now as much looked upon as part and parcel of the work of the year as is the fishing off the coast. I have already intimated that they have been known to ascend the Scottish coast, and go through the Caledonian Canal to the German Ocean, fish down the whole of the east coast, and return home by the Straits of Dover and the English Channel. But the Irish Sea is the chief scene of their labours during this portion of the year. During their stay there they supply the English, Irish, and Welsh markets bordering upon that sea. When the weather is good the Irish boats compete with them; but they laugh when they tell you that whenever the weather is bad they have the fishing all to themselves. The fishermen do not all go to the herring fishing. The old and the very young stay at home, as do such as are indolently disposed. They generally, however, ply the hook and line fishing in the absence of their fellows.

About the end of July the absent fishing fleet reappears off the Cornish coast. The fishermen re-

turn, not to leisure or recreation, but to ply their vocation against a new prey. About the period named commences the early pilchard fishing for the year. The pilchard fishing is a momentous event in Cornwall, the pilchard season being, in fact, the turning point of the Cornish year. From that time up to the beginning of September, the whole coast, from St. Ives to the Rame Head, is in a state of excitement and activity. Extra hands are called into requisition, and whilst some abandon the fields, others quit the mines, to lend their aid, and to lay in for their own and their family's consumption a stock of this favourite and useful fish for the year. So much do the comforts of all the labouring classes depend upon a successful capture of pilchards, that an unproductive season is nearly as disastrous as a deficient harvest would be.

Like the mackerel, the pilchard is caught both by the drift-net and the seine. The description given of the process by which the former is captured will apply to the latter—bearing in mind that the boats have, generally speaking, fewer hands in fishing for pilchards, that the nets are shorter, and that they do not, like the mackerel nets, swim on the surface, but drop some distance below it, being prevented from going to the bottom by buoys attached by short cords to the head ropes. I may here mention, however, that when the nets are thrown, they are so attached to the head ropes as to have a drawn appearance—a device which enables them to bear the pressure better when they have a plentiful take of fish. Were they extended at their full length a heavy catch might break them, when great portions of them would be lost.

Having frequently spoken of the seine fishing, I now proceed to describe it. There is but very little of it now carried on in Mount's Bay, or indeed at any point on the southern coast of the county. There are still a few seines at Newlyn and other stations on the bay; but there are now none at Mousehole, the next fishing village in point of size and importance to Newlyn itself. The chief seat of the seine fishing is St. Ives, on the opposite coast, at which place drift-net fishing is pursued, but to a very limited extent.

Seine differs from drift-net fishing in this, that it is pursued during the day, and almost invariably near the shore and in shallow water. It also differs from it as regards the whole *modus operandi*. To work a seine three boats are required. The first and largest is called the seine boat, and carries the stop seine. It is generally manned by a crew of nine, six of whom are to row, two to shoot the seine, and one called the bow man, on whom the course of the boat depends. The second boat, a smaller one, is called the "volger," or follower, and carries the tuck seine. The third is the "lurker," the smallest of the three, and is chiefly occupied by a functionary called the "huer," and some boys. The whole number of hands usually employed to work a seine is about fifteen, in addition to the boys. The stop seine is of various lengths, being generally from 250 to 300 fathoms. Its depth is from 13 to 16 fathoms. Its meshes are much smaller than those of the drift-nets, the object being to enclose the fish without meshing them. The seine net has a line of head ropes, to which are

attached corks and other buoys, to keep its upper edge near the surface. To the lower edge are attached innumerable small pieces of lead, which bear it down and keep it close to the ground, the object being to shoot the seine in shallow water with a clear bottom. The "tuck" is a similar net, but of smaller dimensions; its mesh is of the same size as that of the seine, but it has in the middle a hollow bag, as it were, into which the fish go when the process of tucking is going on. These nets are very expensive, costing about £300. The boats, with everything complete for seine fishing, will cost from £800 to £1,000. It is obvious, therefore, that none but considerable capitalists can engage in this species of fishing; indeed, almost the whole seine fishing of Cornwall is in the hands of a few wealthy capitalists, the smaller capitalists confining themselves to the deep sea, or drift-net fishing. The seine fishing is usually pursued from sunrise to sunset, the seines, however, being generally shot in the afternoon. The boats having taken their station, remain at anchor waiting for a signal from the huer. The business of this functionary is to take his station on an eminence within sight, and watch for the fish. As soon as he sees them he holds up both hands, in each of which there is generally a bunch of furze, so that the movement can be more distinctly seen. Each seine has its own huer, and the object of the lurker is chiefly to attend upon him if necessary. As soon as this is observed, all is got ready for action on board the little squadron, the huer then indicating, by waving his right or left hand, on which side the fish is to be found. If he is doubtful as to whether there is fish or not, there are signals by which he can send the volger or lurker to reconnoitre in any particular spot. The signal that there is fish being given, the boats weigh anchor and prepare to shoot. The operation of shooting is preceded by another signal, which, being given, the stop seine is thrown overboard, and the two shooters have it all given out in about five minutes. The huer remains at his post giving signals until, by the movement of the boats, the ends of the seine are brought together, by which means the fish are enclosed, and, whilst they do not get meshed, cannot escape. The huer is then taken on board by the lurker, and gives further orders for the management of the seine. The seine is then secured by several anchors, according to the strength of the tide, and the next operation is deferred until low water, or nearly so. That operation is "tucking," and is conducted as follows:—The volger passes over the corks of the seine-net at anchor, and takes up a position in the enclosed space. The tuck-net is then attached to the upper edge of the seine-net, after which the lower edge of it is drawn up, and a quantity of the fish enclosed are caught in the bag or "bunt" of the tuck. The fish is then lifted by "flaskets" into the boats, and sent ashore. There they are put into what are called "corvals," in which they are carried by the women to the cellars where they are to be salted. A corval holds about 360 fish, for carrying which a woman gets 1d. or 2d., according to the distance. The wages of the cellar-women, who salt the fish, are about 3d. per hour, in which time they can lay

down a great many in salt. Seine fishing is too precarious in its results for the men engaged in it to take their chance of the adventure and share in its profits; they are, therefore, invariably employed at fixed wages; the ordinary men receive, on the average, 10s. a week; the seine shooters 12s.; the master seiner has generally 15s.; and the huer one guinea per week. In addition to his wages, the huer claims one seventeenth of the whole fish caught. Sixpence per hoghead is also divided between the two seine-shooters and the bowman, the seine-shooters getting 2½d. each, and the bowman the remaining penny. With the exception of these and the master-seiner, the rest of the crew may be, and generally are, landmen.

During all this time the deep-sea fishers are capturing the pilchards with their drift-nets, and are chiefly instrumental in supplying the home market. The fish caught by the seines are mostly cured for exportation, large quantities of them being sent to the Mediterranean, particularly to Naples and other parts of Italy, where they are largely consumed during Lent. It is thus that a favourite toast with the fishermen is "Long life to the Pope and death to thousands." The thousands, of course, apply to the fish. On my asking one of the fishers why he drank long life to the Pope?

"It would be a bad thing," said he, "if some wasn't to think fish necessary to salvation on a Friday."

The value of the Pilchard fishery may be inferred from the following statement, showing the extent to which it was exported during each of the years from 1833 to 1846 inclusive:—

Year.	Hbds.	Year.	Hbds.	Year.	Hbds.
1833..	9,924	1838..	7,627	1843..	8,820
1834..	25,034	1839..	12,824	1844..	13,959
1835..	23,314	1840..	23,310	1845..	29,986
1836..	18,718	1841..	9,605	1846..	34,350
1837..	15,384	1842..	20,714		

It will be seen that the fluctuation in the quantity exported has been very great from year to year. The price has fluctuated to an equal extent during the same period—having ranged from 33s. to 60s. for winter, and from 35s. to 70s. for summer fish.

The early pilchard season is scarcely closed when preparations are made for the autumnal mackerel fishing. This is generally at its height during the month of October, when the largest and the finest mackerel are caught. It is immediately followed by the late pilchard season in November, which sometimes extends into the following month. But, generally speaking, there is a complete cessation from fishing during the month of December. But even then there is no rest for the fishermen, for this is the time when their chief affairs are effected. The boats are thoroughly overhauled, and the nets carefully inspected, foot by foot; and by the advent of the new year all is prepared for the same routine of busy and adventurous occupation as marked the year which has closed.

From this hurried account of the life and occupation of the Cornish fisherman this at least will be obvious—that, in the main, he enjoys the advantages of continued employment. This is more particu-

larly the case in connection with the deep-sea fishing, which is generally plied by those who combine the capitalist, on a small scale, with the fisherman. The seine fishing affords neither such steady nor such lucrative employment to the great bulk of those engaged in it. It is confined to a particular season of the year, and that not of very long duration. Whilst it lasts it calls into requisition the labour of a great many extra hands, which flock from the interior to the coast. So far as these are concerned, however, the pilchard fishing has this advantage—that it is most active just before and after harvest; thus giving employment, at good wages, to many on shore, whose employment would be otherwise precarious, and whose wages would be low and fitful.

It follows, from the constant nature of their employment, that the fishermen are comparatively well off as a class. To the great majority of them the whole year is more or less profitable. They are not in the position of the ordinary agricultural labourer, who may be employed to-day at wages insufficient for his own and his family's comfort, whilst to-morrow he may be entirely out of work, without a penny wherewith to buy bread for his children. There are few pursuits more liable to fluctuation than that of fishing. It may be profitable to-day and profitless to-morrow; but it has this advantage—that it is sometimes highly profitable, enabling the provident man to provide to some extent against the contingency of profitless adventures. Not so, however, with the agricultural labourer. At the best, his work for the day brings him but a sufficiency for the day. He has no surplus, and can make no accumulation as a resource against a temporary failure of work. The fisherman need never be out of work, though at times his work is profitless. For this, however, he may be prepared; but the agricultural labourer depends upon the continuity of his employment, not only for his comforts, but for the barest necessities of life.

Although the fishermen are comparatively well off as a class, they are not all equally so. They are divisible into three classes—those owning the boats or the boats and nets, those owning the nets alone, and those only having their labour to bring to the work. These classes differ in their relative proportions at different points of the coast. Those who own the boats and nets, or the boats or nets separately, are the capitalists of their calling. When the fishing is at all prosperous they make a good thing of it, by the appropriations made at the division of the spoils to the boats and nets. You can almost always distinguish a fisherman thus situated by his generally healthy look, and the superior style of his house, family, and dress. His profits may frequently be discouragingly small; but a season must be very unfavourable indeed to reduce him to very straitened circumstances. The loss of a boat or of a net may ruin him, and reduce him to the condition of the lowest class of his calling. The nets are sometimes destroyed by an over-take of fish; at other times they are cut, particularly the mackerel nets, which swim on the surface, by vessels passing to and fro in the Channel. The lowest grade of fishermen are no strangers to privation. It is seldom that

they can command much beyond the necessities of life, and not always even these. After the seventh, and sometimes only the eighth, is laid by for the boat, they get only their share of the moiety which remains, the other moiety going to the nets. Their earnings are neither large nor regular, although their work is tolerably continuous. In addition to this, they have to submit to great extortion in their purchases of such necessities as tea, coffee, and sugar. They cannot afford to go to Penzance and buy in quantities of the retail dealers there, thus paying but one retail profit. They purchase in small quantities from an inferior set of dealers, who charge their own profit over and above the retail profit in Penzance, the poor consumers thus paying two retail profits instead of one. This is one of the penalties of being poor. Poverty is at every disadvantage. This of itself is sufficient to account for the scanty command which this class of fishermen have, even in the best of seasons, of the comforts of life. They are a more emaciated and sickly-looking, whilst they are a less spirited, set of men than their more fortunate brethren possessed of a little capital in the shape of boats or nets.

For the last few seasons all classes of fishermen have been more or less in a depressed condition. Not that the fishing has been unfavourable or the prices very unremunerative. The great cause of the depression of all, and of the privation which has overtaken the lowest class of them, is the failure of the potato. This has been a great blow to the fishermen. Some of them used to raise their own potatoes, but the great bulk purchase them. But few have raised any this year, and fewer still are able to buy them at their present price. Independently of their cheapness when abundant, the potato is the best accompaniment to the pilchard, which forms the staple of the fishermen's food. They will only eat bread to it when potatoes are not to be had. When they do eat bread, that of which they are most fond is the barley-bread, which they bake in the form of a loaf. Indeed this is general throughout Cornwall, barley bread being consumed by the fishers, miners, and agricultural labourers. The labourers of Devon and Somerset would turn up their noses at it. Nothing but the finest flour will satisfy them. Yet the barley-bread is both sweet and nourishing. I have frequently tasted it and found it excellent. It has the additional recommendation of being comparatively cheap. When the potato is used with the pilchard they are boiled together, or the potato is mashed and then baked before the fire with the pilchard over it. The oil of the fish is thus diffused through the potatoes, and strongly flavours them. When bread is used it is a common practice after the pilchard is cooked to squeeze it between two pieces of bread. It thus gives out its oil, with which the bread becomes well saturated. The pilchard is a very fat and oily little fish. Naturalists may tell us that it is not exactly a herring, but it looks amazingly like one. It also greatly resembles the herring both in taste and flavour; both, however, being somewhat stronger than those of the herring. To those accustomed to pilchard (and what Cornishman is not?), the herring appears a dry and tasteless fish.

It is a great favourite because it is strong and tasty, and generally very cheap. It is also liked by families because at a meal each member of the family has generally his own fish. This prevents the squabbling which sometimes takes place over a larger fish, which has to be divided.

There was, perhaps, no district in England on which the loss of the potato fell with greater severity than on Cornwall; yet when the distress was at its greatest height, the sufferers could not be prevailed upon to eat Indian-corn bread. They seemed to be utterly ignorant of its very nature, their aversion to it having a no more respectable origin than a groundless prejudice.

This season there are many of the lowest grade of fishermen and their families in the deepest distress. Numerous instances of extreme privation came under my notice in the smaller fishing ports. At Mount's Bay the proportion of this class is smaller, as regards the whole number, than elsewhere. The distress is greatest where there are families of very young children, or where the families are large, and consist mainly or wholly of girls. Some most painful instances of privation under these circumstances came under my observation at Looe and Polperro.

Much privation is of course averted from the door of the fisherman by his great command of fish. The practice is to salt such fish as cannot readily be disposed of on coming ashore. Pilchards, cod, ling, and hake are thus salted, either for sale should any demand arise, or for the use of the family during the season. The curing houses, where the fish are dried and salted, are to be seen dotting the hill-sides in the neighbourhood of all the fishing ports. They present a singular appearance against the dark hill-sides, overhanging such places as Mevagissey and Polperro.

When the boys are active, too, it often happens, even before they are old enough to be taken to sea, that they cost little or nothing to their parents so far as their diet is concerned, especially during the busier parts of the fishing season. When a boat goes out for pilchards, it frequently occurs that it brings to shore a quantity of other fish. Of this other fish neither the boats nor nets get any share, the whole being divided amongst the men. On coming ashore they pick the best of them for their own use, and leave the rest to such boys as will, in consideration thereof, clean out the boat. They light a fire, and cook the fish themselves. At Polperro they cook them at some lime-kilns in the neighbourhood, digging up a few potatoes, perhaps, from a neighbouring field to eat along with them. They often in the same way procure large cray and unsaleable shell-fish, which they cook and eat, without making their appearance at home until bed-time.

Again, the privation to which many are subjected is to a great extent attributable to themselves. Some suffer as the consequence of their improvidence and bad habits; others from being very inexperienced at their vocation. Two boats may fish close to each other, one of which may return laden and the other empty, so much depends on the fishermen.

I am told, by one well acquainted with the lives,

habits, and necessities of the fishermen, that they cannot live at all comfortably under 13s. a-week. It is not easy to get at the exact number employed in the Cornish fisheries. About Mount's Bay alone there are fully 1,500 men and boys so employed. In order that they should live comfortably it is necessary that they should land each year about £50,000 worth of fish. Of this sum £36,000 should go for wages, and the remaining £14,000 for repairs. It is extremely difficult to get at a fisherman's earnings, as it is only the seine fishers who have fixed wages. But, taking one year with another, they are supposed to amount to from 10s. to 13s. per week. This is of course applicable only to the lowest grade of fishers, the others earning much more if the season is at all prosperous.

As regards the house accommodation of the fisherman there is the same difference to be observed as there is in reference to his wages. The lowest grade are the worst housed; and at some points, such as Looe and Mevagissey, their habitations are of the most straitened and filthy description. There are tenements in West Looe and Mevagissey that may well vie with the cellars of Leeds or the attics of Rosemary-lane. The same observation might at one time have applied to Polperro, which, when I visited it, was remarkably clean. The whole town had been whitewashed externally, and the floors in almost every house were kept sanded and clean. The rooms were well ventilated, and everything had a neat and tidy appearance about it. Some tenements were indeed squalid and miserable enough, but the description here given applies to the great bulk of the town. Polperro has been rewarded for its cleanliness, for it has escaped the visitation of the cholera. So much cannot be said of Mevagissey. This place also underwent a general cleaning, but no sooner was its purification effected than the inhabitants relapsed into their former habits of filthiness, and now almost every trace of cleanliness is gone. Here the cholera fell with terrible severity. The people of Mevagissey form in many respects a marked exception to those of most of the other fishing towns. The inhabitants of the neighbouring districts stand in dread of them, and hold no communication with them beyond such as is absolutely necessary. At St. Ives there is also much domiciliary wretchedness; but the greatest misery in this respect is to be found in the decaying fishing stations to the north-east of that town. At Mount's Bay they are better off. In Newlyn and Mousehole, the two largest villages, the bulk of the houses are comparatively good. They are not so crowded as elsewhere, and have all at least two bedrooms. They have also two rooms below, one of which, unless the occupant has a covered place behind, is used as a cellar, where fish are cured and salted. A fisherman's house is not complete without his cellar. If he has not one under his roof he must hire one elsewhere. The evil of filthy and over-crowded dwellings is much enhanced in some of the fishing villages by the number of agricultural labourers who, by the clearing system, are driven into them from the circumjacent rural parishes. The rent of a house averages about £4.

The better class of fishermen and the provident of all classes have clothing for shore and clothing

for sea. That for shore is used when they are at work on land, in addition to which they have generally a Sunday suit.

Whenever butcher meat figures in their diet, it is almost invariably fresh. They eat too much salt fish to have any relish for salt meat.

The diseases to which they are liable are mostly of an inflammatory character. They are also frequently subject to cataract, from exposure combined with much straining of the sight.

When I visited Newlyn and Mousehole (*Cornicè Mouzle*), I found the fishermen standing about in groups, evidently discussing some point interesting to them all. On reaching Mousehole I inquired what it was, and was informed that they were waiting in momentary expectation of getting news of the approach of the late pilchards. They were waiting, one of them told me, to hear of the "north coasters;" these being neither more nor less than the pilchards, which, descending from St. George's Channel, strike about this time of the year the coast of Cornwall. Within the memory of living man it is only since 1819 that they have been in the habit of coming from this quarter. Some of the oldest fishermen remember hearing their fathers say that they knew them to do so. They were rather late of making their appearance this year, and some anxiety was felt on their account. Scouts were daily running from St. Ives to Mount's Bay bringing tidings concerning them. It is at St. Ives they first touch, after which they turn the Land's End and enter the Bay. If they have not made their appearance by this time the late pilchard fishing will be a failure for the year. This will be a serious misfortune.

Although but a mile and a-half apart from each other there is a great difference between the character and habits of the people of Mousehole and

those of Newlyn. There is much more recklessness in the latter than in the former. The men of Newlyn do not drink on board, but they drink a good deal on shore. A tipsy man is scarcely ever seen in Mousehole. This great reform is the work of the last few years. There were formerly five public-houses in the village; and now, although it has a population of about 1,500, it does not afford sufficient custom to support even one. The habits of the people are in all respects superior to those of Newlyn. No fisherman from Mousehole will take to the sea on a Sunday. Every one of them attends some place of worship or other on that day. They are generally Methodists. They are also very well educated, considering their circumstances. The village school is a very efficient one.

As indicative of their energy I may here mention, that the fishermen of Mousehole have, at a cost of £1,400, built for themselves a pier, which with the breakwater built many years ago by the Government forms their little harbour. To construct it they raised £1,200 on their own joint bond, which they are paying off by instalments, each boat being put under a yearly contribution for the purpose. But their harbour is far too small, and they are very anxious that the Government should aid them in enlarging it. The assistance of Government might be much worse bestowed.

On the whole, therefore, although considerable distress at present prevails amongst a portion of this laborious, adventurous, and deserving class of men, their privations are seldom so severe or so long continued as are those of the agricultural labourer. Nor is there a class, not even the lowest grade of fishermen, the members of which, by ordinary care, activity, and providence, may not place themselves in a far better position than that of the labourer in the fields.

(To be continued.)

ON THE CHEAPEST MODE OF FEEDING STOCK.

It is not surprising that men's minds should now be universally turned to the *cheapest* mode of feeding stock. It is a question forced upon every man, by the very low prices at which fat meat of all kinds sells by the producer; and happy will it be if "necessity" here should so far be "the mother of invention" as to make the process of beef-manufacturing remunerative.

It need scarcely be mentioned that there are two modes, as regards food, by which the feeding of cattle may be reduced in expense—either by the adoption of a new kind of food of a cheaper description, and equally efficacious for the purpose; or by so preparing any known description of food as to economise its use and fit it for a more profitable assimilation in the animal economy.

The oscillation of public opinion for and against linseed, as against linseed-cake, is somewhat

remarkable; but it is probable that it depends a good deal upon the peculiar cases to which each is respectively applied. Where fat alone is to be made—in other words, where matured and full-fleshed animals are fed, and where little more than the waste of flesh has to be supplied, it would be reasonable to assume that if the linseed itself could be so prepared as to be capable of ready digestion and assimilation, it would be preferable; whereas, if the animals were growing ones, and their food of a thin and limited description, it were desirable to supply a highly nitrogenised substance. Now the difference between linseed itself and linseed-cake is this: the former contains a larger quantity of oil and less husk—which, by the bye, like bran, may not be altogether useless; the latter, less oil, but more proportionate quantities of nitrogenous matter, as

well as more mucilaginous and saccharine material. The recent analyses of Professor Way, Professor Anderson, and others, have done much to add to our information on these points; and the following difference per cent. between linseed itself and linseed-cake is worthy of a careful study by all persons interested in the feeding of cattle.

If we take the three points, viz., the per centage of water, of oil, and of nitrogen, in English seed and English cake, they will stand somewhat thus:

	Linseed.	Cake.	
Nitrogen	4.35	4.57	per cent.
Oil	34.76	13.52	"
Water	10.62	8.60	"
Ash	3.52	7.27	"

If we take a foreign sample of each, it will be as under (say Russian):

	Linseed.	Cake.	
Nitrogen	3.41	5.14	per cent.
Oil	36.37	11.86	"
Water	9.44	8.88	"
Ash	4.78	8.39	"

Taking, however, the English specimen as being that which most commonly represents the food in use in this country, we have some curious facts as to the purchase-value of the two articles. If we take the person who purchases a ton of linseed, we shall find that he pays the price of the article—he it seven pounds or twelve pounds, or any other price per ton—for nearly two hundred-weight of *water*; whereas, if he expends the same, or any other sum in cake, he will be purchasing a little more than one and a half hundred-weight of *water*—so much for what is worthless. But in the first case he purchases also nearly seven hundred-weight of oil; whereas, in the latter, he buys only two and a half hundred-weight. Hence if oil, in any of the forms in which it may be given, be fat nearly ready-formed, it would seem he was obtaining that in a large quantity. We have heard of those who attempted to feed, or who recommended the practice of feeding, their cattle on barley-meal and linseed-oil: if the oil be so desirable, it seems a pity to pay for its extraction by the crusher and all the profits of that trade. But even to the feeder of growing or immature stock, where the elements composed of nitrogenised material or albuminous matter are so valuable, we cannot see any great advantage; for a party buying a ton of linseed will obtain of nitrogen some 95½ lbs.; while one expending his money in linseed-cakes will obtain only 100 lbs.—the difference being only some 4½ lbs. of nitrogen per ton.

Professor Way says, "Now as linseed-oil contains no nitrogen, it is obvious that the cake must be richer than the seed in albuminous principles, in the exact proportion of the oil which is lost by

the pressure." That the expression of a non-nitrogenised substance from one which is nitrogenised must increase the proportion of nitrogen in the latter is perfectly true; but that it does so in any very great degree is obviously not the case, by the analysis of the Professor himself, for there appears to be a difference of only 0.22, or less than one quarter per cent! But, we would ask, is there not also a larger proportion of husk in the latter than in the former? And as this is often found to come from the animals whole, we may fairly infer that it will nearly be a set-off for the excess of nitrogeneous matter in the cake as compared with the seed.

The variations in the qualities of linseed-cake as manufactured in foreign countries—not more perhaps than the different kinds in this—will be interesting, and we give them below:

	Nitrogen.	Oil.	Water.	Ash.
French	4.72 ..	9.06 ..	7.60 ..	7.89
American	4.74 ..	11.41 ..	7.60 ..	6.35
German & Dutch ..	4.65 ..	9.84 ..	7.98 ..	9.56
Russian	5.14 ..	11.86 ..	8.88 ..	8.39
Italian	5.03 ..	11.84 ..	9.03 ..	7.55
Sicilian	4.72 ..	6.80 ..	9.46 ..	8.02

Now if these are compared with the English given above, we shall perceive that they all contain much less oil than the English, and hence the absurdity of the notion that they are re-crushed in England for the purpose of extracting more oil. Is it not to make these old and bad priced cakes rather into a more saleable and *English* article, and so to make a profit to the crusher?

Persons acquainted with the proximate elements of which linseed cake and linseed itself are composed, will not be surprised to hear that there are various other kinds of food which are closely identical with both these, and which may be obtained for a price considerably below either of these now much-sought-for, and expensive sources of food for cattle.

There are, however, it must be admitted, arcana far beyond the mere chemical analysis where organization is to deal with, which to a very considerable extent modifies the mere chemical composition of bodies; and there are the mysterious selections of instinct, and the influences of a Protean vitality, which assume a status out of the reach of chemical analysis, and move in a sphere removed from the laboratory of the physical philosopher.

Animals—especially wild, but even domesticated animals—have an instinctive appreciation of the best kinds of food, as a rule. We do not mean the very first taste, especially of tamed animals; but practice will invariably teach them to choose the food most nutritious and useful, and to reject that which is the least serviceable. Instinct teaches the

wild animal to reject the herb which is injurious or poisonous: the same instinct, in a modified sense, preserves domesticated animals; but that much of this may be maternal teaching is pretty clear from the fact, that lambs brought up pets, without a mother's care, often die from eating poisonous herbs; while domestication will also often so influence the cow as to make her eat with all the avidity of a natural instinct even glass, or rags, or leather, so depraved will sometimes become her appetite, by the mere habits of artificial existence brought on by servile domestication.

Exceptional as these confessedly are, and making proper allowance for them accordingly, we must not forget that they by no means affect the rule; and as such rule, we find cattle invariably preferring such materials of food as are the most nourishing—namely, oil-cake, bean-meal, &c., and giving a decided preference to those articles above all others which experience teaches us are the most suitable for nourishing the system.

Amongst new substances analogous to linseed oil-cake is the cotton-seed oil-cake, which is used extensively throughout the whole of the East Indies for the purposes of cattle-feeding. In quantity the seed is about double that of the cotton, so that there must be an enormous quantity available. Assuming the annual consumption of cotton in this country to be three millions of tons, there will be at least 156,000 tons of seed extracted, which it appears may be available as food for cattle, and at a very small cost. We understand it may be bought on the spot at some fourteen shillings per ton, but the freight would be high, perhaps as much as £4 per ton. If the oil were worth anything, it appears pretty clear that the cake itself would be far from costly, even at this rate. We give Professor Anderson's analysis of this cake as compared with linseed cake:—

	Cotton-seed cake.	Linseed cake.
Water, ...	11.19	8.60
Oil, ...	9.08	13.52
Sugar, ...	10.70	not given.
Nitrogen, ...	3.95	4.57
Ash, ...	5.64	7.27

It would seem that though the cotton cake is inferior in most if not all the desirable qualities of linseed oil-cake, yet it still possesses them in an inferior degree; but it is pleasant to the taste, and is bitter, according to Professor Anderson, and of a much less mucilaginous character than the linseed oil-cake.

We agree with Professor Anderson in thinking that a practical trial would be very desirable, and would suggest that it is a proper one to be taken up by the Royal Agricultural College at Cirences-

ter, where so many appliances are ready for weighing, registering, &c.

In accordance with the practice in French Flanders, Mr. Pusey tried an experiment with rape-cake, as food for stock, in 1849, and gave in the "Journal of the Royal Agricultural Society" of that year an account of his experiments. The price of the two kinds of cake were £9 and £5 per ton respectively. He commenced by mixing one-tenth part of rape-cake to nine-tenths of linseed cake, until he increased it to one-fourth of the whole cake, for his fattening tegs, or shearlings as they are otherwise provincially called; while to his old ewes he increased the proportions, until he gave them rape-cake alone. He then refers to the analysis to show its elements to be capable of fat-forming as well as flesh forming, and adds that no bad consequence followed from 500 sheep using this food, but does not unhappily give any experiments as to the comparative merits of the two in actual feeding. We give side by side the analyses of rape and linseed cake—

	Rape-cake.	Linseed cake.
Water, ...	6.62	8.60
Oil, ...	10.62	13.52
Nitrogen, ...	5.58	4.57
Ash, ...	10.71	7.27

Now, we think that there can be no doubt whatever that rape-cake may be advantageously, and especially as respects economy, substituted for linseed cake, at least to a certain extent; and we are glad to have an opportunity to give our personal testimony to the decided success with which it is practised by a gentleman who, as well as being a sound practical farmer, and a man of considerable general scientific attainments, is also a very observing naturalist, fond of studying the habits and instincts of animals: we allude to Charles Charnock, Esq., of Holmfild House, near Ferrybridge, in Yorkshire. This gentleman has for many years used it as a substitute for linseed cake; if we remember rightly, he gives it alone, unmixed with the latter, and accustoms his very lambs to it, by giving it to their mothers, and to them as soon as they are disposed to eat it, from the lambing season to the period when they are sold off fat, which is in the spring of the first year; and so superior are his hogs, or tegs, or, if we please, "unshorn lambs," that they are as fat and as heavy at one year old as many farmers show them at two; and indeed now in these days of fat-repudiating mutton, by far too heavy for the market. We say, therefore, that after this practical fact, sustained by years of experience from such a man, we have no hesitation in recommending a trial of *rape-cake as food for stock*, and especially sheep.—Gardeners' and Farmers' Journal.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House, in Hanover-square, on Wednesday, the 29th of May: present, the Earl of Chichester, V.P., in the chair; Lord Camoys; Sir Charles Lemon, Bart. M.P.; Sir James Ramsay, Bart.; Sir Robert Price, Bart., M.P.; Col. Austen; Mr. Raymond Barker; Mr. Burke; Mr. W. Clavering; Mr. Pendarves, M.P.; Mr. P. Severn, and Mr. Richard Trench.

Miscellaneous Communications.—Result of trials to naturalise Thibet sheep in Wales, from Mr. C. R. Mansel Talbot, M.P., and information connected with their natural history, from Colonel Sykes. Letters from Mr. Curtis, expressing his opinion on the character of insects destructive to the Wheat and Potato crops, transmitted by Mr. Fisher Hobbs and Colonel Napier. Suggestions from Mr. G. Robinson, of Wolverhampton, for papers on feeding sheep and pigs, and on crops, to be adopted on the failure of turnips. Copy of resolutions passed at the Botley and South Hants Farmers' Club, on questions connected with land-drainage, from Mr. W. C. Spooner, the secretary of that club. Letter from Mr. Drake, on the mottled and white-faced Hereford cattle. Letter from Mr. Brutton, reporting the local advantages offered at Exeter for the trial of H.R.H. Prince Albert's plan of arresting the progress of sewage matter, and converting it into manure for the land. Copy from Mr. A. Castellan, of Liverpool, of M. Hamoir's details connected with the extraction of sugar from the beet-root.

The noble Chairman and Sir Robert Price favoured the Council with interesting local information connected with the history of the breeds of Southdown sheep and Hereford cattle, respectively; and with the change of taste, at different periods, in the preference given to particular varieties by breeders, on account of certain occurrences of colour or conformation, supposed by them to indicate excellence.

Wheel-Axles—Mr. Lee, C. E., of 103, Long Acre, had leave to exhibit to the Council his axle and wheel, intended, by the arrangement of its double action, to prevent the injury sustained by ordinary axles, when subjected to the sudden jerk occasioned by a casual obstacle to the progress of the wheel; by the mode in which lubricating matter could be applied and retained for a long period, in contact with the parts liable to friction, to promote freedom and uniformity of motion; and, by the simplicity of its fastenings, to make the putting on, or taking off, of the wheel, the work only of a moment. Mr. Lee stated that the expense of this construction of axle, applied to agricultural vehicles, would be very little greater than that of the ordinary axles at present in use. The Council gave no opinion on the invention submitted to them, but thanked Mr. Lee for the trouble he had kindly taken in bringing it before their notice, and explaining to them its peculiarities of construction.

Presents.—Among the numerous presents made to the Society were the following:—Treatise on Poultry, from Mr. Nolan, of Dublin; Transactions of the Royal Asiatic Society, and the Yorkshire Agricultural Society; Prize List from the Manchester and Liverpool Agricultural Society; and Reports from the Royal Institution of Great Britain, and the Athenæum Club.

A Monthly Council was held on Wednesday, the 5th of June: present, the Marquis of Downshire, President, in the chair; Earl of Lonsdale; Viscount Hill; Lord Bridport; Lord Portman; Hon. R. H. Clive, M.P.; Hon. W. G. Cavendish, M.P.; Sir Thos. Dyke Acland, Bart, M.P.; Sir Matthew White Ridley, Bart.; Sir Charles Lemon, Bart., M.P.; Sir Robert Price, Bart., M.P.; Mr. Raymond Barker; Mr. Bramston, M.P.; Mr. Brandreth; Mr. Burke; Colonel Challoner; Mr. Evelyn Denison; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Gould, of Poltimore; Mr. Fisher Hobbs; Mr. Lawes; Mr. Kinder; Mr. Neill Malcolm; Mr. Miles, M.P.; Mr. Milward; Mr. Pendarves, M.P.; Mr. Pusey, M.P.; Prof. Sewell; Mr. Shaw, of London; Mr. Villiers Shelley; Mr. Sillifant; Mr. W. Simpson; Mr. Stansfield, M.P.; Mr. Turner, of Barton; and Prof. Way.

Finances.—Colonel Challoner, Chairman of the Finance Committee, laid before the Council the report on the accounts of the Society to the end of the previous month; from which it appeared that, on the 31st of May, the current cash-balance in the hands of the bankers was £2,493. The Chairman explained that this general balance included £1,260 as the Exeter subscription, and £210, as the amount received on account of life-compositions, to be invested; leaving a balance of £1,023 available for current purposes. The Chairman added, that the arrears of subscription remaining unpaid were in due course of recovery, by means of the County Courts, agreeably with the instructions of the Council. This report was adopted.

Prize Essays.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported the further awards made by the Judges of Essays; and the motto papers being laid before the Council, the following result was declared:

I. The prize of £50 for the best Report on the Farming of Lincolnshire, awarded to JOHN ALGERNON CLARKE, of Long-Sutton.—The judges "highly commended" the essay, in the same class, bearing the motto "Hope."

II. The prize of £20, for the best Essay on the Rearing and Management of Poultry, awarded to WILLIAM TROTTER, of Healey Mill, Stocksfield, near Gateshead, Durham.—The judges "commended" the essay, in this class, bearing the motto "Dorset."

Mr. Pusey, M.P., having passed his high opinion on the great value of the two Lincolnshire Essays, then brought before the notice of the Council, Mr. Miles,

M.P. expressed his regret that there was at the disposal of the Journal Committee no second prize, by which they might have had it in their power to mark their estimation of the peculiar value of the second Essay, which the judges had highly commended. Having himself had the pleasure of reading both the Essays, he could say, that although the prize was justly due to the first Essay, it happened in a remarkable manner, that its deficiencies were just those topics which in the second Essay were so fully and admirably treated: so that, great as were their respective merits, neither of them was complete without the other; but by an amalgamation of the two, the most perfect Essay might be produced that had ever appeared in the Journal on that subject, or any other. He made these remarks with confidence, having been for so long a period well acquainted with the peculiarities of Lincolnshire farming, as well as with its progress and present condition. He hoped the talented author of the second Essay, bearing the motto "Hope," would allow acknowledged notes to be added from his own Essay to that of Mr. Clarke, when it should appear in the Journal, in order that the report on Lincolnshire farming might be rendered complete. The Council concurred with Mr. Pusey and Mr. Miles, in hoping that the author would allow this second Essay to be published.

Essay Prizes for 1851.—Mr. Pusey then submitted to the Council the schedule of prizes for the Essays and Reports of next year, the following subjects and respective amounts of which were discussed and agreed to; subject to such conditions of competition as shall be published in the ensuing prize-list of the Journal, and to the Essays being sent to the Secretary at the house of the Society, on or before the 1st of March, 1851:—namely,

Farming of Shropshire	£50
Farming of Northamptonshire	50
Diseases arising from the mismanagement of horses	20
Diseases of Cattle after parturition	20
Agricultural Geology of England and Wales.....	50
Production of Butter.....	10
Any subject in Agricultural Chemistry	20

Mr. Fisher Hobbs then called the attention of the Council to the desirableness of attracting public consideration more strongly to the application of steam and other motive-power to the purposes of agriculture; and an interesting discussion ensued.—Mr. Pusey agreed with Mr. Hobbs on the importance of this question, and the only doubt he felt on the adoption of any means taken to procure an Essay for the Journal, was the interference it might occasion with the objects of the stewards of implements, who, at the country meetings of the Society, only allowed prizes to be awarded after actual trial of the practical value of the implements entered for competition.—Colonel Challoner thought that where a steady, uniform draught was required, as in the use of the windlass, and in the case of the mole and draining ploughs, horses might be much more advantageously employed than they had hitherto been.—Mr. Miles and Mr. Pusey referred to Nottinghamshire and other counties where draining-ploughs had been drawn by means of a moveable wind-

lass.—Mr. Garrett could bear his testimony to the great interest felt very extensively at the present moment on the application of steam-power to agricultural purposes. The minds of many men were actively on the alert to devise means by which steam-power could be best adapted to the requirements, not only of ploughing, but of other field-operations; and many patents, having in view the accomplishment of these important objects, were now in the course of enrolment. No new engine or new power was required, but simply the adaptation of the present steam-power. Mr. Hobbs's suggestion he thought a very good one, and well-timed; for two years ago it would have been premature, two years hence it will be too late. With regard to horses, Mr. Garrett thought it should be borne in mind that the horses on a farm consumed one-fifth of the whole produce of the land, while steam-power would call manual labour and human superintendence into extensive requisition. He conceived that an essay expounding the possibility and advantages of the adaptation contended for, would lead the way to the actual construction, exhibition, and trial of the agricultural engine so much desired.—Mr. Shelley considered, that with reference to motive power, that of water was not to be neglected where it was to be had. With regard to steam-power, he had himself employed it largely, and to his great benefit, for the last two years, and the commonest labourer could manage it. He believed that nothing would so much tend to set the farmer on his legs as the adoption of steam-power, and the efficiency and economy with which its application was in every case attended. He had, however, great difficulty in getting his neighbours to look at his own arrangements, much less to get them to adopt them. He therefore hoped that such a prize essay as Mr. Fisher Hobbs proposed would reach the eye of farmers, and tend to convince them of the opportunities within their reach, but which they had neglected. He thought the Council owed their best thanks to Mr. Hobbs for having brought forward the proposition.—Mr. Shaw, of London, fully concurred in the desirableness of the prize proposed. We were not yet aware of the extent to which steam may be applied, nor the consequent amount of advantage to be derived from its means to the practical farmer. He conceived that a statement of the present application of steam on the one hand, and its prospective applications on the other, to agricultural purposes, would prove of the highest value.—Mr. Pusey concurred in the general opinion of the Council, that such a prize could not interfere with the operations of the country meetings, but in a great degree tend to promote them, by detailing the various modes of applying steam-power to farm operations, and proving its advantages, by showing its economy; he had therefore much pleasure in seconding Mr. Fisher Hobbs's proposition. It was then carried unanimously, "that a prize of £30 be offered for the best essay on the relative advantages of steam and other motive powers, applicable to agricultural purposes," to be sent to the Secretary, at the House of the Society, on or before the 1st of March, 1852.

Exeter Meeting.—Lord Portman laid before the

Council the Report of the General Exeter Committee, which was unanimously adopted. The points to which it had reference were the following :—

1. Preparations for the Pavilion Dinner.
2. Contracts for the Pavilion and Show-yard.
3. Lecture requested of Professor Simonds: "On the Structure, Functions, and Diseases of the Liver in domesticated animals," to be delivered in the Athenæum at Exeter, at six p.m., on Wednesday, the 17th of July.
4. Awards of prizes in the classes of Cattle to be read at the conclusion of that Lecture.
5. Sale of tickets to members only during that day from ten a.m. till six p.m., and on the Thursday to members and any of their friends, from eight a.m. till three p.m.

Mr. Shelley thought the Society was so much indebted to those railway companies who so liberally lent the aid of their extensive opportunities to promote the great objects of the Society at its country meeting, that he would desire the Secretary to report to the Council the present state of his correspondence on that subject. The following is accordingly the list of the companies who, up to the present time, have, in the handsomest manner, granted concessions to the Society's exhibitors, at the Exeter Meeting; namely,

RAILWAY COMPANIES.

Bristol and Exeter
 Chester and Holyhead
 Cocker-mouth and Workington
 East Anglian
 Eastern Counties
 Great Western
 Leeds and Thirsk
 London, Brighton, and South Coast
 London and South Eastern
 London and South Western
 Manchester, Sheffield, and Lincolnshire
 Shrewsbury and Chester
 South Devon
 Stockton and Darlington
 Stockton and Hartlepool
 Taff Vale
 York, Newcastle, and Berwick

The Secretary was in communication with the remaining railway companies, and there was no doubt that they would in the same liberal and enlightened spirit, renew their former concessions for promoting the success of the Society's country meeting at Exeter this year.

Judges.—Lord Portman reported progress that the judges' committees were in active communication with the parties whom they had decided to recommend as judges at the Exeter meeting.

Meeting of 1851.—Lord Portman also reported, on the part of the Inspection Committee, that H.R.H. the Duke of Cambridge, as Ranger of Hyde-park, had in the most gracious and condescending manner expressed the satisfaction it gave him to place at the disposal of the Society, for the show of breeding stock in 1851, that part of Hyde-park near Kensington-gardens which lay between the Serpentine River and the Victoria Gate in the Bayswater-road.—The Council expressed their satisfaction at this additional instance of his Royal Highness's interest in the Society, and his appreciation of the value of its public objects.

A Weekly Council was held at the Society's House in Hanover-square, on Wednesday, the 12th of June: present, Mr. Raymond Barker, V.P., in the Chair; Earl of Lonsdale, Hon. R. H. Clive, M.P., Hon. Dudley Pelham, M.P., Sir Montague Cholmeley, Bart., Sir E. M. Elton, Bart., Mr. B. Almack, Mr. Bastard, Mr. Berners, Mr. Burke, Mr. Burton, Dr. Calvert, Mr. Clavering, Mr. Capel Cure, Mr. Dyer, Mr. Fuller, M.P., Mr. Brandreth Gibbs, Mr. Baskerville Glegg, Mr. S. Grantham, Mr. P. Love, Col. MacDonall, Mr. Lennox Naper, Mr. Parkins, Mr. Pendarves, M.P., Rev. Reginald Chandos Pole, Mr. T. Rowlandson, Prof. Sewell, Prof. Simonds, and Prof. Way.—Colonel Morris, Vice-President of the New York State Agricultural Society, attended the meeting.

Steeping Wheat.—Mr. James Smith, of Wainfleet, Lincolnshire, informed the Council that arsenic having been used this season, by two farmers of his acquaintance, for dressing Wheat, Barley, and Oats, previously to sowing, had proved unnecessarily destructive to the feathered game on their land. He was desirous of ascertaining whether some other equally efficacious, but less deadly poison, might not be employed for the preparation of seed-grain. Mr. Fuller, M.P., corroborated, from his own experience, the destructive effects attending the use of that mineral.—Prof. Sewell had recently seen a statement of a very large number of sheep having been poisoned from the same cause.—Mr. Dyer had found blue vitriol most effectual for steeping grain.—Mr. Raymond Barker had been in the habit of using dry lime with great advantage.

Lime for Slugs.—The Rev. Thomas Cator, of Skelmersdale-park, near Pontefract, communicated to the Council a statement of the mode by which Mr. Leatham Reynolds, one of his tenants, had in 1837, and subsequently, prevented the ravages of slugs, by applying lime to his Clover and Seed-leys, before ploughing them up in the autumn; a plan which had been extensively adopted afterwards by the other tenants of Mr. Cator in that part of Yorkshire, and with the same success. The lime employed had been that obtained at the Womersley quarry; and it had been applied at the rate of three "dozens" to the acre. In one case, that of Mr. Geo. Stones, of Stubbs-Walden, a single acre, in the middle of a six-acre field, had been limed before ploughing up, while the remaining five acres had been left in their ordinary state, the whole of the six-acre field being afterwards submitted to the same uniform management. The result was, that the crop on the single acre was full and good, while on the other five acres the roots were nearly all destroyed by the slug, and had to be re-sown.—Mr. Almack and Prof. Way thought the lime might probably have had a greater action on the growth of the Clover-plant than on the slug, which was often known to withstand the application of lime, especially in dry weather. At the suggestion of Mr. Almack, inquiries were addressed to Mr. Reynolds, on the following points:—1. The peculiar quality of the lime, its difference from the Knottingley lime, and its chemical analysis, if made. 2. Its state, on application. 3. Rate of bushels applied per acre; and definition of

"dozens" of lime. 4. Interval of time between application and breaking up of the ley. 5. Whether the application of the lime occasioned a decided increase of growth in the Clover.

Ventilation of Drains.—Mr. Turner, of Barton, communicated a statement made to him by Mr. John Piper, a tenant of Lord Ashburton's, residing on a farm of 300 acres, at Bucklandfilleigh, near Crediton, on the success with which he had employed for the last twelve months a system for the ventilation of the pipe and tile drains on his lands, which promoted the passage of water through them, and prevented their "blowing up;" a system, as far as he, Mr. Piper, was aware, which he had been the first to employ, having devoted his attention for the last twelve years to the theory and practice of land-drainage; and in consequence of the perfect state of drainage to which one of his fields had been brought, it had now growing upon it a crop of wheat such as he believed had not before been seen in that part of the country. His plan of ventilation was very simple, economical, and durable, and offered no obstacle to the working of implements in the subsequent preparation of the land: it would increase the flow of water through the drains in wet weather, admit the air into them during the summer months, and prevent the growth of fungi within their recesses. Mr. Piper did not enter into a detailed statement of his plan, but referred simply to the principle on which it was founded, namely, the free admission of atmospheric pressure.

Diseases of Cattle.—Prof. Simonds took that opportunity of returning his thanks to the Council, for having again done him the honour to request that he would deliver a lecture before the Members of the Society at their country meeting: a request with which he most readily complied. The subject of the lecture, as requested by the Council, to be delivered by him at the ensuing Exeter meeting, namely, the Liver in Domesticated Animals, would enable him, he hoped, to lay before the members some views and details of great practical value in reference to the diseases of that important organ of the animal frame. The anatomy he thought was too well known to require elucidation; but there were many conditions connected with its derangement of function and change of structure which were of great interest and importance: of these, the "rot" in sheep, and the "red-water," were familiar instances.—The Hon. R. H. Clive, M.P., inquired of Prof. Simonds the extent of pleuro-pneumonia among stock at the present time. He had himself been a sufferer to a great extent. He had been recommended to give alcoholic drinks to cattle affected with that complaint: he wished to know Prof. Simonds' views on the subject.—Mr. Baskerville Glegg also stated, that in Cheshire the dairy cows had been very liable to the attacks of pleuro-pneumonia.—Prof. Simonds had always been opposed to bleeding in that complaint. He regarded it as a purely non-inflammatory disease, in which diffusible stimulants might be of service; but in that case, there were better remedies of that class than the alcohol referred to. He had found kreosote a very valuable remedy; but no specific could be safely recommended, so much depended on the stage

of the disease and the particular constitution of the animal.—Dr. Calvert inquired whether camphor and ammonia had been tried.—Prof. Simonds replied that the acetate of ammonia and various other preparations of that alkali had been usefully employed in the disease.—Prof. Simonds then stated to the Council the progress of the inquiry he had been directed by the Veterinary Committee of the Society to make in reference to cows belonging to tenants of Lord Portman, in Somersetshire, affected for several years with a kind of atrophy or wasting of substance, from some unknown cause. The circumstantial evidence had appeared to fix the cause of the malady on the water the animals had been in the habit of drinking; but Prof. Way's examination detected in that water no ingredient prejudicial to health, and his own anatomical examination of one of the animals slaughtered for the purpose, led to no discovery of the poisonous action of such water. The serous membranes of the body, those in particular of the lungs and abdomen, were much affected. He hoped by the next month to complete his report on this subject, and in it to submit to the Council, through the Veterinary Committee, the whole details of the case. In the meantime, two of the animals had been removed to the Royal Veterinary College, and were rapidly improving in their condition, although only ordinary care was taken of them.—Mr. Raymond Barker thought that in many cases animals were lost from the want of a sufficient amount of wholesome and nutritive food.—Mr. Capel Cure then submitted to the Council the case of disease among his own stock. He had occupied his farm at Blake Hall, in Essex, for the last 30 years. The arable and pasture grounds were very good, and well drained. His stock consisted of 17 dairy cows, 6 bullocks, and 12 calves, the health of all which had been very good until June last year, since which time he had lost 20 of them. The disease had first appeared among the fattening stock, and very little time had elapsed between the attack and death; and it prevailed variously among animals of different age and condition. It had been prevalent in the neighbourhood, but not so severe as in Mr. Cure's case. The outbreak could not be traced to any particular circumstance of contagion or infection. The symptoms were shortness of breath, and other indications of pleuro-pneumonia. All the animals attacked had died excepting one.—This case having been referred to the Veterinary Committee, Professor Simonds has been directed to proceed to Mr. Capel Cure's farm, and to report the result of his inspection.

The Agricultural Society of Caen transmitted to the Society various Reports and Essays connected with their proceedings, for which the Council ordered their thanks.

NEW MEMBERS.

Edward Ludd Betts, Esq., of Preston Hall, Maidstone, was elected a Governor of the Society.

The following new members were elected:

Badcock, Henry, Taunton, Somerset
Barnard, Rev. Mordaunt, Little Bardfield Rectory, Braintree
Bingham, Richard, Bingham, Melcombe, Dorchester

Brown, William Williams, Allerton Hall, Leeds
 Carden, John, Barnane, Templemore, Ireland
 Campbell, Sir Alex. T. C. Bart., Newton House, Barnstaple
 Carter, Thomas, Scales, Richmond, Yorkshire
 Chetwynd, Viscount, Teignmouth, Devon
 Collins, Rev. C. M. E., Chudleigh, Devon
 Cotton, H. P., Quex Park, Isle of Thauet, Kent
 Croote, G. H., Crooke, North Tawton, Devon
 Dewe, William, Westleigh House, Bideford
 Douglas, James, Athelstan-ford, Drém, Haddingtonshire
 Drake, Charles, Cutliffe, Springfield, Barnstaple
 Dunn, Colonel, R.A., Denford House, Hungerford
 Feilden, H. Master, Croston Lodge, Chorley, Lancashire
 Fisher, Rev. John Campbell, Harford, Sidmouth
 Fryer, William Fleming, the Wergs, Wolverhampton
 Gibbs, Robert, Carhampton, Dunster, Somerset
 Gomm, Lieut.-General Sir William Maynard, K.C.B. (Commander-in-Chief of the Forces at Bombay), 10, New-street, Spring-gardens
 Harness, Thomas B., M.D., Tavistock, Devon
 Howard, James, Alphington, Exeter
 Karslake, Rev. W. Heberden, Mesham, Southmolton
 Kennedy, Rt. Hon. Thos. Francis, Dunure, Ayrshire
 Kinneir, Richard, M.D., Livingshays, Silverton, Collumpton
 Ley, Henry, Ley House, Mamworth, Devon
 Mackay, Thomas Henry, jun., Petham House, Canterbury
 Merson, Richard, Brinsworthy, Northmolton, Devon
 Mogridge, Richard, Molland, Southmolton

Monday, John, Staplegrove, Taunton
 Morris, Thomas, Maisemore, Gloucester
 Moorsom, Capt. W. S., Great George-street, Westminster
 Mules, Rev. James, Yarnscombe, Barnstaple, Devonshire
 Norrish, Samuel, Horwell House, Colebrooke, Crediton
 Overell, John, Aspenden, Buntingford
 Owen, William, Rotherham, Yorkshire
 Paramore, J. Rawle, Southmolton, Devon
 Pennell, Richard Lewin, M.D., Exeter
 Prickman, Thomas, Broadnymet, North Tawton, Devon
 Quartly, John, Champson-Molland, Southmolton
 Riccard, Russell, M., Southmolton, Devon
 Savery, John, Silverton, Exeter
 Sedgwick, Rev. Leonard, Lathkirk, Middleton-Teesdale
 Shelley, John, Avington, Hampshire
 Sydney, John, Wolaston, Wolverhampton
 Thomas John, Cholstrey, Leominster
 Tucker, John, Morehard-Bishop, Crediton
 Wainwright, Chas., Rawlinson, Shepton-Mallett
 Walker, Samuel, Barn Park, Teignmouth
 Ward, John, Donnel Farm, Whittington, Oswestry
 Webb, Richard Anthony, Oxtou, Exeter
 Wills, George, Whelmstone, Colebrooke, Crediton
 Winter, John, Ash-Priors, Taunton
 Woolcombe, John M., Ashbury, Okehampton, Devonshire
 Woolcombe, Rev. H., High-Hampton, Crediton, Devonshire
 Wreford, Samuel, jun., Grattan, Crediton
 Wright, Richard, Field Bank, Macclesfield.

THE LATE MR. JAMES SMITH.

Whatever opinions may be entertained on the peculiarities of the system of draining adopted and advocated by the late James Smith, of Deanston, there can be no difference on the fact of his being an able, original, and energetic man; nor any, that he has done much for the age in which he lived, and given a great impetus towards, at least, the right principles of the drainage of clay soils. And though we may fancy we see a doggedness in retaining once-formed opinions, and a strange pertinacity in holding them and something, perhaps, of a dogmatic spirit in enforcing them; yet it cannot be denied that a great man is gone, both in designing and carrying out what was vast and comprehensive. Whether he always did everything in the most facile and economical methods, or whether he had not some of the ambition to carry out his points to a great amount of expenditure in making a thing perfect, rather than to a large return for the outlay, we will not argue; because, give him the comprehensive, the vast, and the difficult, and he was at once the man for carrying his point!

As a mechanical genius and an engineer he confessedly stood high. His work at Lewis will at once stamp him as a man of acute and comprehensive mind; but he more than all, in our opinion, deserves a statue in honour of his services,

for giving a right direction to the public mind on the subject of draining strong land.

To what extent soever the system of draining clay land deeply and thoroughly may have been practised in the South of England, it was neither sufficiently known nor appreciated to become a model; but the improvements at Deanston, brought prominently before the public in the evidence before the House of Commons on agricultural distress, gave a great impetus to the system, and immortalized James Smith as the deep drainer of the day. Occupying at Deanston, a farm of what in Scotland is called a red clay—different it must be confessed in tenacity to the clays of Buckinghamshire, or any of the beds of the lias, and what in England would be called strong loam—he drained uniformly at a depth of 30 inches, and on the soil we have described from ten to fifteen feet apart. He then filled up some fifteen inches with broken stones, leaving fifteen inches of puddled soil above them, and then he laid the whole surface of the land perfectly flat and level; added to this, he subsoiled, or stirred the subsoil without bringing it to the surface, and by this means rendered the soil so porous and friable as to dispense upon it altogether with fallows, and to be enabled to grow green crops in their place.

His system he called a *deep drainage system*, because it went deeper than the received perfection of drainage in his day; and as all things are great and small only by comparison, he met with a vast storm of prejudice from those who drained from 18 to 24 inches deep, who asserted that his system was utterly useless, and burying of tiles to no purpose to go so deep upon strong land; and so was his laying down of flat surfaces, as they contended that the water needed a fall to the tops of each drain, and then required a very shallow stratum of porous material, through which to run speedily into these drains. Hence they threw out all the clay, and filled up with soil—sand, gravel, or any porous material. He, in contradistinction, was anxious that each drop of water should find its way down in the place where it fell: hence, he puddled the clay directly over the drains, in order, as far as possible, to overcome the tendency of the water to drop excessively into them; and rather aimed at the making of the soil through which the water percolated a natural filter, so as to have it clear in the tiles. He, moreover, called his system the *frequent drain system*, not because the intervals he selected for his drains were so much smaller than those of his contemporaries, but because it “provided frequent opportunities for the water *rising from below*, or, falling on the surface, to pass freely and completely off.” Here he recognized the pressure of land-springs below, and the force of gravitation from above, and laid down a system calculated, as he contended, to remedy both these inconveniences, in contradistinction to the prevailing system of the day, which attempted to remedy one only of these disadvantages. Moreover, from the supposed, and correctly supposed, tendency of his system to leave a large area of active soil unsaturated with water, and through which the air was freely passing, as well as the roots of plants, and from which the cold evaporation was to a certain extent prevented, he therefore

denominated his system one of *thorough draining*.

We are not now about to enter into the question whether the Deanston system of 30 inches, or the more recent, and now more fashionable, one of 48 inches, is the best. It does not invalidate the claims of James Smith as the deep-drainer of his day, and the introducer of a better and sounder and safer system of clay drainage, that some deeper drainer has followed in his wake. He stands stamped as a great man, whether his system is best or only second-best; and ought to be regarded not with chilling neglect by posterity, but with admiring gratitude should that memory be cherished which broke in upon the prejudices and wont practice of his age, whatever opinion may be entertained of any subsequent improvement of his system which might be introduced at a subsequent period.

We cannot, and will not, for one moment attempt to deny that there was a doggedness of opinion about James Smith, a degree of exclusive attachment to 30-inch drainage, which savoured of prejudice and weddedness to his own system; nor did he, we think, make proper allowances for differences of substrata; but, we would ask, is there not as much one-sidedness, as much dictatorial and dogmatic teaching, by his deeper-draining compeers? and can we charge upon him exclusively, as a failing, that which equally belongs to his class? Nay, more, as the inventor of the sub-soil plough (we use the definite article advisedly; for, all in all, a better for *general purposes* has not been introduced), as the improver of the reaping-machine, as a mechanical genius, a great and original thinker, and general agricultural improver, especially when great difficulties and a gigantic mind were required, we hesitate not to repeat that posterity will look upon James Smith as a great man, and, above all, a benefactor to his race. May more be raised up like him!—Gardeners' and Farmers' Journal.

OAT-HAY, AND THE RELATIVE NUTRITIVE VALUE OF OATS, CUT GREEN, AND CUT FULLY RIPE.

BY DR. A. VOELCKER, PROF. OF CHEMISTRY, ROYAL AGRICULTURAL COLLEGE, CIRENCESTER.

It is now generally admitted, that it is more profitable to reap corn crops before they are fully ripe; but we still want a series of well-conducted experiments, made with a view to ascertain that state of ripeness of the different grain crops which is best calculated to secure the largest return of money to the farmer, and to detect a ready means by which the practical man will be enabled to recognise dis-

tinctly this desired state of ripeness—or, in other words, the best time for reaping his corn crops.

With respect to wheat reaped at various times, we possess a series of careful experiments, made by Mr. John Hannam, which prove, in a satisfactory manner, that one period of their age is better than another for reaping wheat; and that the advantages, which result by reaping wheat before it

is fully ripe, are very considerable, and, indeed, almost surprising, when we calculate the benefits following such a practice to the extent of ground under wheat culture in the kingdom. Mr. Hannam's interesting experiments are recorded in the *Quarterly Journal of Agriculture* (vol. xii., p. 22-37, and vol. xiii., p. 170-187), and are well worth a perusal by any one who feels inclined to make a number of experiments with the other corn crops, in the direction which Mr. Hannam first followed in his experiments with wheat. I am convinced that every one, who will devote the same degree of attention, zeal, and circumspection to a set of such experiments, as Mr. Hannam has given to his on wheat, will not only gain the thanks of all interested in the progress of agriculture, but will also feel the satisfaction of having contributed their share to the increase of the wellbeing of the country—a duty which becomes daily more pressing, since the increase of the population, without a corresponding increase of food, is attended by many evils, which press heavily on the wealth of the country. The loss of grain incurred by the reaping of perfectly ripe grain, or by the shaking of the ripe plants by wind, is sometimes considerable; and if we add to this the unavoidable loss which we will have to suffer in carting and stacking fully ripe corn, I think we must be convinced that, on this account alone, corn should not be allowed to become fully ripe. But it is not enough to know that the only means to avoid the shaking effects of the wind, or the necessary manual operations, is to reap the crops before they are quite ripe; we likewise require to be informed what the best time is for reaping our generally cultivated corn crops, and how that time can be recognised by the degree of ripeness of the plants. The general rule which Mr. Hannam laid down, with respect to wheat, appears to hold good with oats; for Mr. Stephens, in his *Book of the Farm*, mentions an observation which he accidentally had occasion to make, which is in perfect accordance with Mr. Hannam's experimental results. Mr. Stephens observes, that he once cut down a patch of potato oats, to obtain a more convenient access to the stack-yard in which the hay-stack was to be built. The oats were full-grown, quite green, but full in the ear. When threshed by the flail, the sample produced was a most beautifully silvery plump grain. The next year Mr. Stephens cut down a larger patch of potato oats in the same state; and this result, as well as those obtained in subsequent trials, was equally favourable as in the first instance. I am not aware that any experiments have been made with oats, with a view to ascertain their comparative money value, reaped at different periods of ripeness; and I may be allowed, therefore, to recommend the subject to the intelligent

farmers of Scotland, as one of the greatest importance, well worth careful investigation. It is not my intention to report on experiments of my own on this subject; but as my attention has been directed to a subject closely connected with the one referred to, I could not help bringing to recollection the interesting experiments of Mr. Hannam, and recommending them as a model for similar experiments.

In this paper I shall report on some experiments which I made, with a view to ascertain the relative nutritive value of oats cut down green and oats fully ripe, in as far as chemistry is justified to give an opinion on this point. My attention was first directed to investigate this matter by Mr. James Walker, of Glyn, by Larne, county Antrim, Ireland, who, during his residence at the Cape, had occasion to observe the excellent feeding properties of oat-hay, and whose experience of them has convinced him that oats cut green have better feeding properties than oats allowed to ripen; and that also the straw is better for converting into manure. In order to enable me to investigate how far the theoretical nutritive nature of oats, in the two mentioned stages of growth, corroborated Mr. Walker's practical experience, this gentleman kindly supplied me with samples of potato oats in straw, grown at Newport, Fifeshire, by Mr. Alexander Russell. Sample No. I. was quite ripe, the ear and straw of bright yellow colour. No. II., on the contrary, quite green, but the ear fully formed, though still a little milky. Both samples were grown on sandy soil, upon the same field, of a uniform character, and cut at the same time, the green oats having been sown about a month later than the ripe sample.

I. Oats fully ripe.—In order to ascertain the water in the straw and grain, one plant was taken, and the straw and grain weighed separately. The straw of the whole plant, air dried, weighed 119.7 grains. It was dried in a water-bath until it ceased losing weight; and when perfectly dry the straw weighed 79.50 grains. The amount of water, therefore, in the straw was 33.58 per cent. The number of pickles of this plant was 100; the weight of which, with the husk, was 70.17 grains; when dried at 212° F., they weighed 53.20 grains, and had lost, consequently, 24.18 per cent. of water. Another plant yielded 76.55 grains of straw, which was dried in the water-bath, and left 43.42 grains of dry straw; and therefore contained 43.27 per cent. of water. The number of pickles was 91, which weighed in the wet state 59.54 grains; when dry 48.88 grains; the amount of water in them, therefore, was 17.13 per cent.

II. Oats cut green.—One plant gave 92.16 grains of straw, air dried—perfectly dry, the straw weighed 42.46 grains. The amount of water in the straw,

therefore, was 53.92 per cent. The same plant contained 64 pickles, which weighed 38.04 grains wet; dried at 212° F. till constant, the weight was 29.15 grains; per-centage of water, 23.37. Another plant of the green unripe oats gave 212 grains of wet straw; when dried at 212° F., it weighed 100.30 grains, and had lost, therefore, 52.68 per cent. of water. The number of pickles of the same plant was 100, which weighed, wet, 57.77 grains; when perfectly dry, the weight was 38.15 grains; they had lost, therefore, 33.96 per cent. of water.

In the following table these results are put together, in order to facilitate their comparison with each other:—

OATS FULLY RIPE.

No.	One plant of Oats.	Weight of Straw.	Weight of Pickles.	No. of Pickles.	Proportion of Straw to Grain.	
					Straw.	Grain.
		Grains.	Grains.			
1.	Wet	119.7	70.17	100	62.94	37.06
	Dried at 212° F.	79.5	53.20	..	59.91	40.09
	Per centage of water	33.58	24.18	..	..	..
2.	Wet	76.55	59.54	91	56.24	43.76
	Dried at 212° F.	43.42	48.54	..	47.21	52.79
	Per centage of water	43.27	17.13	..	..	..

OATS CUT GREEN.

3.	Wet	92.16	38.04	64	76.67	23.33
	Dried at 212° F.	42.46	29.15	..	58.65	41.35
	Per centage of water	53.92	23.37	..	..	..
4.	Wet	212.	57.77	100	78.58	21.42
	Dried at 212° F.	100.3	38.15	..	72.22	27.78
	Per centage of water	52.68	33.96	..	..	..

A glance at this table teaches us—

1. That the unripe oats are more succulent—that is to say, that the per centage of watery juices in the grain, and in particular in the straw of the green oats, is greater than that in the fully ripe oat-plant.

2. That the dry grain of the oats, cut green, is not so heavy as that of the fully ripe oats; 100 pickles of the fully ripe oats producing 53.2 grains of perfectly dry oats in one case, and 53.34 grains in the second (91 pickles giving 48.54 grains); whilst 100 pickles of the green oats weighed only 45.54 grains according to the first experiment (64 pickles weighing 29.15 grains), and only 38.96 grains according to the second experiment.

3. That the greater the produce of straw which the different plants furnished, and the more succulent it is, the smaller the produce of grain.

In No. 1, the straw of the whole plant weighed dry 79.5 grains, and contained 33.58 per cent. of water; for 79.5 grains of dry straw we obtain 53.2 grains of dry grain, or for 100 of dry straw, 66.9 of dry grain.

No. 4 is a plant cut green, which produced 100.3 grains of dry straw, and contained 52.68 per cent. of water; for 100.3 grains of dry straw we obtain

only 38.15 grains of dry grain, or for 100 grains of dry straw, 38 grains of dry grain.

No. 2 produced 73.42 grains of dry straw, and contained 73.27 per cent. of water; the produce of dry grain was 48.54 grains; for 100 grains of dry straw we obtain therefore 111.7 grains of seed.

No. 3, the plant cut green gave 42.46 grains of dry straw, with 53.92 per cent. of water, and 29.15 grains of dry seed; for 100 grains of dry straw we obtain therefore only 68.6 grains of dry seed.

Before I give the following details of these experiments, I may be allowed to make a few observations in reference to the most economical mode of using food for cattle, and to the nutritive value of articles of food in general.

Much remains to be acquired by us before we shall have arrived at anything like a rational knowledge of the process of nutrition; and though it cannot be denied that, during the last years, many persons have been engaged in investigating experimentally the relative nutritive value of articles of food, or in advancing theoretical speculations calculated to throw light on the imperfectly understood or rather still mysterious process of nutrition—all which endeavours were useful in so far as to dis-

perse many erroneous views, and to establish many well-authenticated facts, in place of *floating*, and often contradictory knowledge—yet we are bound to confess that, notwithstanding all that has been said and written on the relative value of articles of food, we are still far from that practical knowledge which teaches us how to make the best use of food—that is, how to obtain the best results with the greatest economy in food. Many of our theories are plausible, and clever too, but nevertheless cannot be depended on, simply because they are not based on experience, and consequently do not express the real state of matters. Experience in this, as in so many other things, should be our only guide, and no one ought to attempt to recommend a favourite theory of his own to practice—by praising certain modes of culture, or recommending certain articles of food, and certain practices in feeding cattle, &c.—before having an opportunity of testing his theoretical speculations by experience. I think if scientific men would always avail themselves of this *experimentum crucis*, for testing the correctness or falsity of their theoretical speculations, we would hear less of the disappointments of practical farmers, and fewer complaints of chemistry doing them no good; at all events, they would save themselves the trouble of writing, and the agricultural world the still more onerous task of reading, undigested favourite ideas, which, strange to say, are frequently prescribed in the shape of practical recommendations. On the other hand, I am convinced that practical men will remain in the dark on many of the most important points of agriculture as long as they despise the aid of chemistry, and persist in solving inquiries connected with agriculture by mere blind experimentising—by experiments, I mean, made without plan, or clearly-defined and distinctly-understood objects. If those engaged in such *random trials* would bear in mind that nature does not give a precise answer to an indistinct question; and if they would be candid enough to believe, in all cases in which an experiment has failed to fulfil their expectations, that the experiment itself or the anticipated result must be false in principle, and that consequently the fault is their own, and not on the part of nature—a great deal of good would be effected. Unfortunately, however, most men are as quick in condemning the value of the materials used in a bungling experiment, as they are eager to praise, and enthusiastic in recommending every result when the experiment proves favourable to their views; and when such an experimenter has some kind of theoretical notion in his head, with which the experiment happens to tally, the case is still worse. In this way a great deal of harm has been done, and the progress of scientific agriculture retarded instead of advanced; and I have no

hesitation in saying, that such experiments are utterly worthless, and calculated to do harm instead of good. To make a good experiment is a far more difficult task than many are inclined to imagine; indeed, it is very difficult, and requires not alone a considerable amount of theoretical knowledge, but also much practical skill, patience, circumspection, caution, zeal, energy, modesty, and above all, sincerity—qualifications which happily are still to be found, but which are seldom so in the possession of one and the same individual. It is not knowledge alone which makes a good experimenter; nor is it practical skill alone, nor zeal and sincerity. If the first were as wise as Solomon, but with no candour, his experiments would not deserve any confidence, and hence would be worthless; and again, however zealous and conscientious a man may be, if he have no knowledge, he will never make a good experiment. It is, therefore, not one or two of the enumerated qualifications, but the union of them all in one individual, which are calculated to make a good experiment—a union, no doubt, of gifts which we but rarely meet with. There are few men of whom it can be said that they are good farmers, good chemists, and good men, in one person; and I think that, generally speaking, it requires all the energy, zeal, and time of one man, to become either the first or the second, and to fulfil all the duties conscientiously of one particular calling, leaving the endeavour to become a good man out of consideration, as a duty incumbent on all men. However, this must not discourage us: the principles of division of labour are well understood in other professions, and I do not see why they should not find an application equally well in ours; and I am convinced that in the course of a few years we shall be in possession of a series of well conducted, well considered experiments, which cannot fail to benefit the practical husbandman, if chemists and agriculturists would unite more closely than they have hitherto done in the endeavour to settle questions, which, considered by the chemist or agriculturist alone, will remain problems for ever, but which must yield to the united efforts of both, and cease to be unsatisfactory.

These few general remarks on experiments apply more in particular to experiments on feeding which have been already made; while other experiments are still required on the principles now enforced, before we can form a rational idea of the relative nutritive value of articles of food. Our knowledge on this subject, as mentioned in the outset, is still in its infancy. It is true we know that the substance of all articles of food does not consist of one element or one simple combination: we all know that the substance of different kinds of food is exceedingly variable, and hence we infer that it must be so. Let

us take, as an example, milk—an article of food prepared by nature itself, of which we know that it is perfectly capable of supporting animal life by itself, when consumed in sufficient quantity by the animal. Cow's milk consists of the following substances:—

a. Nitrogenous organic substances (casein and extractive matters).

b. Organic substances free of nitrogen (butter, milk, sugar, &c.)

c. Salts (chloride of sodium, phosphates, &c.)

d. Water.

Now, the same substances we find in all sorts of milk—in the milk of the ass, goat, cat, dog, or any animal, we find the same substances. The qualitative composition of all sorts of animal milk is the same; but if we inquire after the quantitative composition of different kinds of milk, we soon find out a great difference in the relative proportion of the above-named substances. Thus we find, in the milk of the cow, goat, and sheep, for 4·5 parts of nitrogenous substances, about 8 parts of non-nitrogenous substances. In the milk of the dog, on the contrary, we find, for 19 parts of substances containing nitrogen, 14·7 parts of non-nitrogenous materials. These differences, in the relative proportions of these two classes of bodies found in milk, cannot be accidental; and as milk alone is capable of supporting growing animals, we are justified in inferring, that the relative proportions of nitrogenous and non-nitrogenous substances in the food for full-grown animals must be a fixed proportion, different for every kind of animal. Our reasoning is supported by the fact, that animals which are quite tame when fed properly, get wild and unmanageable when too large a proportion of nitrogenous food is given to them; and that swift and active creatures get lazy and heavy when the food they consume contains too great an excess of non-nitrogenous food. The fact that there are so many fat bakers, no doubt, finds its explanation partly in the excess of amyleaceous food consumed by them. That we cannot trespass, without impunity, the laws of nature, nobody can deny; and although I cannot share the opinion of some writers, who think the Irish are lazy and apathetic because the great mass of the population of Ireland lives almost entirely on potatoes, and that the English are an active and energetic nation, on account of the beef and porter with which their table is supplied, I nevertheless believe in a certain connection which exists between the food and the moral and physical constitution of man.

It is well known that no man, nor any animal, can exist without food containing nitrogen. It is impossible for any animal to live for any length of time on food which does not contain nitrogen,

however great and varied the daily supply of such food may be. The proportion of the nitrogenous and the non-nitrogenous substances in many articles of food has likewise been determined, and their relative nutritive value been estimated according to the quantity of nitrogen they contain; but it is clear that the proportion of nitrogen which an organic compound may contain cannot be regarded as an absolute measure of its greater or smaller nutritive value, because the proportion of nitrogen is only one factor amongst other circumstances which ought to be taken into account, in judging the nutritive value of an article of food, and because a part of the nitrogen may exist in the food in a combination which is not at all fit to increase its nutritive value. Now, to this latter point I wish to draw particular attention, as it appears to me that it has hitherto been overlooked by many, or met with a consideration which evidently shows that no particular importance is attached to it. The form, I think, in which food should be presented to animals, is as essential as its composition; and if we take only the latter into consideration, in determining the nutritive value of any article of food, we cannot be surprised if we arrive at conclusions contradicted by experience. However, the proportion of nitrogen may serve, in many cases, as an indication of the greater or lesser nutritive value; and if we have reason to believe that the nitrogen is contained in combinations which are analogous to casein—for instance, in albumen, fibrin, gluten, &c.—and if our comparison is restricted to different varieties of food belonging to one class of organised compounds, (*i. e.*, if we compare different root-crops with each other, or different grain crops, or leguminous seeds, &c., with each other,) we are justified in pronouncing those articles which contain the greatest proportion of these compounds the most nutritious. Another important point, in judging of the nutritive value, is to pay due regard to the influence of those constituent parts of food which are not assimilated by the animal organism, and consequently rejected with the *fecæ*. The amount of nitrogen, therefore, at the best, can only be regarded as an indication in estimating the probable nutritive value of an article of food, but it never can represent the actual feeding quality. It is quite possible that one kind of food may contain just as much, or even a larger proportion of nitrogen than another, and nevertheless the latter be more nutritious. Amongst other reasons, one principal ground of this apparent anomaly is, perhaps, founded in the circumstance, that the first substance is so indigestible that the stomach of the animal cannot afford the time necessary for the complete digestion of that kind of food, and hence much of its nutritive matter will be rejected in the

droppings of the animals fed upon it. Another kind of food, though perhaps not so rich in really nutritive matter, on account of its greater digestibility, is assimilated more readily by the animal organism: the droppings of the animals fed upon it will not contain particles of food which have not undergone some change, for the food has fulfilled its purpose, and none of its nutritious elements have been lost. As an illustration of this, I may mention a case familiar to every farmer. Dry unbruised corn escapes frequently half-digested from the horse, in consequence of which a large amount of its nutritive matter is lost; but if the same food is presented in a less solid state, if the corn is first bruised, it is rendered more digestible: the whole of the nutritive matter has a chance of becoming assimilated, and the practical result is, that a smaller quantity of bruised corn goes a much further way than the unbruised. Instances of a similar nature occur frequently enough to practical men, but the consequences are seldom traced to their true causes; and thus it happens that an article of food is pronounced worthless, which, prepared in a judicious manner, or given along or mixed with other substances, might have proved a most valuable one.

I will not at present occupy the attention of the reader, by enumerating other influences which ought to be taken into account before we can give an opinion as to the nutritive value of an article of food, because I think the few I have referred to will confirm my assertion, that our knowledge on the process of nutrition is still in its infancy, and that the determination of the nutritive value of an article of food is not so easily found, but that it requires, on the contrary, a thorough study into the nature of food and the vital processes—a study which cannot be successfully cultivated by a person whose mind is prejudiced by a favourite or fashionable theory, but which will be rewarded by the happiest result, if prosecuted with candour; while, at the same time, nature is chosen as our guide, and experience held as the only ground upon which we are justified in building theoretical speculations.

The following nitrogen determinations were made according to the method of Dumas—a method which is described in works on analytical chemistry, and is well calculated to secure accurate results, provided certain precautions have been taken, which I cannot enumerate in this place.

I. Oats fully ripe.

a. Whole grain.—1.253 grammes, dried at 200 deg. C., gave 24.54 c. c.m. of moist nitrogen, at a temperature of 5 deg. 6 min. C. and 751.8. m.m. barom. Nitrogen, $2.39 = 14.92$ of protein compounds.

b. 0.646 grammes gave 13.9 c. c.m. of moist nitrogen, at a temperature of 12 deg. 8 min. C, and

756 m.m. barom. Percentage of nitrogen, $2.54 = 15.87$ of protein compounds.

c. Straw.—0.809 grammes of straw, dried at 100 deg. C., gave 9.81 c. c. m. of moist nitrogen, at a temperature of 17 deg. 8 min. C. and 765.3 m.m. barom. Percentage of nitrogen, $1.33 = 8.31$ of protein compounds.

d. 0.927 grammes produced 10.63 c. c. m. of nitrogen, at a temperature of 14 degrees 4 m. C. and 761.2 m.m. barom. Percentage of nitrogen, $1.36 = 8.62$ of protein compounds.

II. Oats cut green.

a. Whole grain.—0.943 grammes, dried at 100 deg. C. gave 22.9 c. c.m. moist nitrogen, at a temperature of 12 deg. 2 min. C. and 758.4 barom. Percentage of nitrogen, $2.87 = 17.93$ of protein compounds.

b. 0.770 grammes gave 17.99 c. c. m. moist nitrogen, at a temperature of 5 deg. 3 min. C. and 760 m.m. barom. Percentage of nitrogen, $2.85 = 17.81$ of protein compounds.

c. Straw.—1.125 grammes of dried straw produced 16.36 c. c. m. of moist nitrogen, at a temperature of 11 deg. 1 min. C. and 760.7 m.m. barom. Percentage of nitrogen, $1.74 = 10.87$ of protein compounds.

d. 0.749 grammes gave 11.43 c. c. m. of moist nitrogen, at a temperature of 12 deg. 2 min. C. and 758.7 m. m. barom. Percentage of nitrogen, $1.80 = 11.25$ of protein compounds.

These results, represented in a tabular form, admit of better comparison, thus:—

	RIPE OATS.		OATS CUT GREEN.	
	1st Ex- peri- ment.	2d Ex- peri- ment.	1st Ex- peri- ment.	2d Ex- peri- ment.
WHOLE GRAIN.				
Percentage of nitrogen,	2.39	2.54	2.87	2.85
equal to				
Protein compounds, . . .	14.92	15.87	17.93	17.81
STRAW DRIED AT 100 C.				
Percentage of nitrogen,	1.33	1.36	1.74	1.80
equal to				
Protein compounds . . .	8.31	8.62	10.87	11.25

This table shows that the straw of the unripe oats is considerably richer in those principles which serve to replace the waste of the muscular fibre, and that the grain of the unripe plant is likewise more nutritious. That the green straw should be more nutritive one might expect beforehand, but I was quite unprepared to find the proportion of protein compounds in the grain of the unripe plant larger than in the fully ripe, for which reason I repeated the analyses; and as I took care to avoid any source of error, I got nearly the same results in the second determination, and cannot, therefore, doubt the correctness of the analytical results.

These results I communicated to Mr. Walker, asking him at the same time to favour me with a short account of his practical experience in the feeding qualities of oat-hay; and as I have no doubt that his observations will be interesting to many, I insert his answer in reply to my letter.

"GLYN, BY LARNE, COUNTY ANTRIM,

June 2, 1849.

"I am made extremely happy in the receipt of your favour of 29th May, and trust your forthcoming paper will meet that attention from the agricultural world its importance and your treatment of the subject merit. When your paper gets into circulation, and practical men test the virtues of the food I recommend against a like quantity served and used as at present, experience will corroborate my assertion, as your present analyses so far do, 'that a very material saving is effected by cutting the oats intended for live stock while the straw is yet green, the ear being nevertheless fully formed though still milky, or nearly so.'

"My own experience at the Cape of Good Hope, (though confined to young horses), leads me to assert, that oats thus reaped and cut into chaff, half-inch to inch length, will go one-fourth further than the same allowed to ripen, and used as in this country. I need hardly allude to the evident saving of labour—saving of there being no risk of the best grain shaking out and being lost—the different appearance a manure-heap would have at this season for turnips, &c.,—all these will strike the intelligent husbandman, and induce a trial on different kinds of stock, which, I doubt not, will amply repay the attention you have devoted to my suggestion.

"JAMES WALKER."

Mr. Walker's practical experience that oats cut green are highly nutritious, is in perfect accordance with Mr. Stewart's of Glenormiston, who recommended oats to be cut green and used like hay, under the name of oat-hay, and who likewise found it to be an excellent food for horses. Some animals appear to be very fond of oat-hay: Mr. Stewart informs us, in his paper, that his horses

preferred this fodder to every other kind of hay. The practical experience of Mr. Walker and of Mr. Stewart finds its explanation in the analytical results given above, which show distinctly that, apart from all other advantages, which are in favour of oat-hay, the relative proportion of really nutritive matters in equal quantities of oats cut green, and oats fully ripe, is larger in the former than in the latter. I say apart from all other advantages, for there are several to which Mr. Walker has hinted at in his letter; but I will only add a few remarks, before I conclude, to the very important one referring to the superiority of manure. It is not only the better appearance of the manure-heap which speaks in favour of the use of oat-hay, but the fact itself is a sure indication how thoroughly the food has been digested in the stomach of the animal. The reason why oat-hay is more readily and completely digested than fully ripe oats is obvious.

I have shown, in the above experiments, that oats cut green contain more watery juices than oats allowed to become fully ripe; in other words, oat-hay contains a larger proportion of soluble substances, which are readily digestible, but which substances become insoluble, and less readily digestible, when oats are allowed to ripen on the land. Again, we all know that the young shoots of many vegetables are found to be soft and eatable, and, like young roots, and readily digestible; but these shoots or the young roots become woody and indigestible, when allowed to grow for a couple of months longer. Animals, which fed upon the young shoots will thrive very well, can scarcely maintain themselves on the more matured food; a great part of it becomes indigestible, and, when consumed by the animal, passes through the intestines in a great measure unchanged. The reason of this difference is, that the starch, gum, sugar, and other soluble and readily digestible substances, which we find in the young shoots of vegetables and roots, and partly rendered insoluble, and gradually changed into indigestible woody fibre, which substance increases with the age of the plant.—*Journal of Agriculture.*

ON THE FOOD OF PLANTS.

(From the French.)

BY A FARMER.

If we imagine a soil properly pulverized, and yet retaining such a degree of firmness and consistency as to give a secure hold to the roots—a plant situated in it will find a matrix at once suitable to receive and transmit the atmospheric influence, and

also to supply the moisture necessary for the wants of the plant. But if the mineral ingredients of such a soil are insoluble and fixed (as it is expressed in chemical phraseology), a plant will certainly live in such a situation by deriving much of the food it

requires from the atmosphere. But vegetation in such a situation, and under such circumstances, will not suffice for the farmer. It is only by means of certain soluble ingredients in the soil that this normal state is attained; and if the soil does not contain these soluble substances, or does not contain them in sufficient quantities, it then becomes our business to supply them. These supplementary substances (if the expression may be allowed), this sustenance for the plants, to which the name of "manures," or "stimulants," have been given, according to the point of view under which they are contemplated, is therefore an important subject for study. After having given the plant a suitable dwelling-place, we must also supply it with suitable food: in this respect plants resemble animals. But in order to understand what we are about, it may be advisable briefly to recapitulate the principles of vegetable physiology on which this doctrine is based.

If we call to mind the mechanism of vegetation, we find that water, containing various substances in solution, penetrates by endosmosis into the roots, rises from thence by capillary attraction under the bark, where it is called *sap*. When it reaches the leaves a portion is removed by evaporation, and the solution of course becomes more condensed. Under the action of air and light, the free carbonic acid contained is decomposed—carbon is fixed in the plant, and oxygen given off into the air. During the night, on the contrary,* the oxygen of the air is absorbed by the leaves, combined with the carbonaceous elements of the sap, to be again decomposed at the return of light. The solid matters present in the sap are deposited, according to their special natures, round the cellular vessels, or on the surface of the leaves, or at certain determinate parts of the structure; the superfluous or injurious matter being carried off by the descending sap, and eliminated from the roots as excrement.

It is unnecessary to follow the sap through the various changes its elements undergo—the successive changes by which sugar, mucilage, gluten, albumen, and the various vegetable acids are formed—this part of the subject belongs to vegetable physiology.

All soluble matters within their reach being absorbed by plants (a fact well ascertained even in the case of virulent poisons), which of these substances are so essential to vegetation that plants in general cannot be deprived of them without suffering? And, in the second place, do certain kinds require certain substances to be present in the soil, which are not absolutely necessary to others? In a word, is

* This assertion that during the absence of light growing vegetables vitiate the air, is to be received with some caution, as it is by no means well established (Translator).

there in vegetables a universal food, so to speak? or does each plant require a special one? These are the questions which we have to examine.

1st. *The Food necessary for all Vegetables.*

The attempt has often been made to ascertain by experiment the substances essential to vegetation, or those by means of which the vegetable can live and grow, though deprived of all others. It has at least been ascertained that a plant cannot live without oxygen and carbonic acid. In an atmosphere deprived of moisture a plant will not live; water is therefore also indispensable, not only on account of its solvent powers, but also because its elements enter into the formation of many of the products of vegetation. As for carbonic acid, that which is absorbed by the leaves, though sufficient to support life, does not appear to be enough to secure the full development of plants, as the following experiment (which also goes to prove the importance of vegetable matter in the soil) will satisfactorily show.

Two boxes were taken, the one containing soil calcined so as to destroy all organic matter; the second contained soil in its natural state. In both a few grains of peas were sown, and it was observed that the plants in the former were much less vigorous than those in the natural soil. Upon examination, the first contained .46 of its weight, and the second .57, or rather more than half its weight, of carbon. This difference was undoubtedly owing to the carbon present in the second box.

In all the experiments which have been made, none have, as yet, been undertaken under such circumstances as to exclude nitrogen in its simple form, so that we cannot speak positively as to its importance. But as it is universally present in the form of ammonia, and as it enters largely into all the more important vegetable products, we may safely affirm that nitrogen is requisite for plants.

Thus, oxygen, water, carbonic acid, and nitrogen, are the primary and indispensable elements of vegetation. Their action is undoubtedly assisted by the important agents heat and light, and in all probability by electricity.

Chemical analysis demonstrates the justice of this conclusion. Amongst a great number of substances, varying with the species, the climate, and the soil, these important ingredients are always present. They exist in the form of starch, gum, sugar, manisite, ulmic, gallic, acetic, malic, citric, and other acids, and neutral substances. In a word, they form the basis of the almost endless variety of organic compounds which modern chemistry has brought to light.

2nd. *The special Food of Vegetation.*

It might have been thought that the above men-

tioned substances would have sufficed to give stability and solidity to plants, especially as carbon forms such a large proportion of the vegetable tissues. If even this had been possible, the framework of a plant is not exclusively composed of carbon, certain alkaline and earthy matters being always found to be present along with the organic portion of vegetation. The difficulty exists in the varying proportion in which these alkaline and earthy substances are found, not only in different plants, but in even the same species when grown upon different soils. They are to a certain extent interchangeable amongst each other, so that it is difficult or impossible to say which of them are absolutely indispensable to vegetation. It is even possible to imagine a plant *existing* without any of them, in the same way as a mammiferous animal may live after all the solid portions of bones have been removed*. In both cases, though life might be maintained, neither the animal nor the plant could fulfil their destined uses. Besides the materials necessary to support life, as oxygen, water, carbon, &c., there are therefore others, which, though of less importance, are necessary to enable plants, as well as animals, to arrive at full perfection. It is therefore of importance to ascertain how these are introduced into vegetation.

The plant lives and grows by absorbing into its substance the various gaseous elements that exist in the atmosphere and the soil. The water absorbed by the roots contains, in solution, a considerable quantity of the alkalies and earths; drawn upwards towards the extremities of the plant, this solution is evaporated by the leaves. The various solid matters which are thus introduced, after passing through a great number of chemical changes, are then by the flow of the sap dispersed over the plant. Are we then to consider these substances as excretions which the vitality of the plant is able to carry no further, or are they essential to the organization of the plant?

If the substances of which we speak are only to be regarded as excretions, or as an attempt made by the organs to relieve themselves of useless matter, it becomes necessary to explain how it happens that potash and soda, added to a soil deficient in alkalies, so powerfully assist vegetation. We can only understand the action of these substances, by supposing them capable of supplying an element necessary to the growth of vegetation, and perhaps they also in some way or other assist the chemical

changes which are going on in the interior of the plant.

For certain plants it is necessary to admit the value of chalk or lime; and the importance of gypsum to certain of our cultivated plants, is also sufficiently well-known to prevent it from being considered a substance to which they are indifferent. If it be also considered that silica, alumina, (?) phosphoric acid, oxalic acid, &c., are not deposited indifferently in all portions of the plant, but in certain special determinate organs; that there is therefore, on the part of these organs, a certain power of choice—a vital action, which enables them to separate those substances from the sap which they require, to the exclusion of others—it is difficult to assign any other reason for this well known arrangement, except that nature has prepared a special place for each of these substances, and has assigned them certain determinate functions in the formation of the vegetable tissues.

These reflections conduct us to the conclusion that a great number of the earthy and alkaline substances, carried by the current of the sap into the circulation, are useful to vegetation, by giving to them their full vigour, their proper size, and their diversified properties. We do not yet pretend to be able to assign to each one of these various substances its particular function in accomplishing these important ends. It may, perchance, be shown at some future time, that certain compounds are absorbed and assimilated by plants in the state in which they exist already in the soil, or in the manure. The science of vegetable chemistry is yet far short of perfection, and holds out the most brilliant results to those possessed of the industry and skill necessary to investigate this difficult subject.

After having thus settled the first question proposed, another one arises—Do all plants make a similar consumption of the soluble materials present in the soil, or have they the power of selecting those most suitable to their wants? In a word, do the different species of plants require, each one, a different nutriment?

Plants, even when grown in the same soil, do not draw up a sap exactly identical. Saussure has proved in the most positive manner that the roots have the power of selection, though his experiments on the unequal absorption of different salts are not quite satisfactory: for instance, sulphate of copper, though soon causing the death of the plant, is absorbed in as large quantities as any of those compounds which are beneficial to vegetation. Saussure explains this anomaly by showing that in the case of the sulphate of copper, the roots were decomposed, and consequently except at the commencement of the experiment, only acted mechani-

* We very much doubt the possibility of an animal living under such circumstances; if even it could, such abnormal existence or disease (as it should be called), does not afford ground for comparison.

cally. It was well ascertained that the substances present in any solution were absorbed in very different proportions where their substances were not, like the sulphate of copper, positively injurious—for instance *Bidens* (bur-marygold?), and *Polygonum* (buckwheat?), absorbed the salts in the following proportions :—

	<i>Bidens.</i>	<i>Polygonum.</i>
Chloride potassium.....	16 ..	14.7
Chloride sodium.....	15 ..	13.0
Nitrate of lime.....	8 ..	4.0
Sulphate of soda.....	10 ..	14.4
Muriate of ammonia.....	17 ..	12.0
Acetate of lime.....	8 ..	8.0
Sulphate of copper.....	48 ..	47.0
Gum.....	32 ..	9.0
Sugar.....	8 ..	29.0
Humus (<i>extrait de terreau</i>) ..	6 ..	5.0

These experiments were repeated with the greatest care, and it was proved—1st, That plants absorbed all mineral substances when dissolved in water: 2nd, That they were absorbed in very different proportions, according to the plant experimented on; this absorption was also quite irrespective of the fluidity of the solution: and 3rd, That organic matter, when dissolved in water, is not in that shape absorbed by the roots, but decomposed by their influence, and then partially absorbed.

1. Without entering into the minute details of the experiments, the absorption of the following substances was proved—prussiate of potash, chloride of sodium, sulphate of copper, acetate of lead, chloride of barium, ioduret of potassium, and many others. The absorption of nitrate of silver, corrosive sublimate, and gallic acid, did not take place until after the death of that portion of the plant plunged into their solution.

2. When the plants were placed in a solution containing two salts in equal proportions, it was satisfactorily ascertained that they were absorbed in different proportions. Even, when the salts were present in different proportions, this elective absorption was not deranged. In a solution containing three times as much common salt as nitre, a plant of *Chenopodium viride* (Goosefoot) absorbed much more nitre than common salt; whilst the contrary took place with *Solanum lycopersicum* (Nightshade). Other plants selected also common salt, and the *Tamarix* choose only sulphate of magnesia.

3. It was also ascertained that, when a plant was placed in a solution of fermenting manure, the disagreeable smell, which had been previously emitted, gradually disappeared.

If these experiments have not quite settled the question, they have at least strengthened the opinion that plants appropriate to themselves soluble sub-

stances in very different proportions. Chemical analysis of different plants grown on the same soil, also completely establishes this proposition. With regard to the oxygen, carbon, hydrogen, and nitrogen, chemical analysis has also proved that they are present in plants in proportions varying with the species, but agreeing very closely in the same plant. Analysis has also most clearly established the great diversity of the proportions in which different plants assimilate the alkaline and earths. For example, some plants will be found to contain common salt in large quantities, whilst wheat grown on the same soil will contain none. Other plants again, as the wall pellitory, the nettle, and borage, will be found to contain nitrates in large quantities, though they may be grown alongside of plants containing none at all. It seems therefore impossible to avoid the conclusion that plants possess the property of choosing, or at least of retaining, certain substances in preference to others, and, consequently, that different plants require different food.

But this opinion does not rest on the authority of chemical analysis alone, it is confirmed by the experience of agriculturists. For instance, it is known that certain manures seem especially to favour the growth of certain plants—as gypsum for clover—that certain plants only thrive on soils where they can obtain an abundant supply of a special ingredient, as the fern and the chestnut, on soils rich in potash, or such as are derived from slate rocks, and those of volcanic origin; that a mixed husbandry is the most productive; that a plantation containing a variety of trees produces more wood than if one species alone had been planted. These multiplied facts prove that it is not a certain quantity of a nutritive principle, but a choice amongst several that is necessary to vegetation.

3rd. *Researches respecting the Food most suitable to different Plants.*

The difficulties which we encountered in attempting to settle the general question become still more serious as the attempt is made to descend from general to particular cases.

It is rarely that an opportunity occurs which enables us to decide upon the effect of such or such a manure upon plants. To do this with certainty the substances tried must be in a state of chemical purity; and as plants are composed of a great number of different substances, it would also be necessary to try each one of these separately, and to observe the effect of their application, and of the want of them—an admirable subject for the study of those who are ambitious to establish on sure grounds the principles of scientific agriculture. The long and difficult experiments necessary for this purpose

have as yet hardly been commenced, and our knowledge of this important subject is as yet merely empirical. But the information we already possess must not be despised because it has not as yet arrived at the perfect solution of the question, especially as the benefit of certain mixed manures to certain plants is well known. In addition to the examples quoted in a former part of this paper, the benefit of lime to cereals, and of the sulphates to leguminous and cruciferous plants, is well known. But the very limited number of instances we can quote, is a significant proof of the state of our knowledge. The most of the manures used contain a great number of the elements of vegetation, and it is difficult to distinguish what each plant carries off, and what is left for future crops.

In the meantime, until the experimental applica-

tion of different manures shall have pointed out what is most suitable to the plant we wish to cultivate, we have no other guide than chemical analysis, or examination of the quantity of nitrogen, carbon, and mineral matter present in the ashes of the plant. Such an analysis shows us the substances which a plant has absorbed. But it is only after having submitted the growing vegetable to an experimental test, that the effect of these various nutritive matters, and the theory of vegetable food, can be established on a settled basis. When we shall have arrived at results from the combination of these two methods, first ascertaining by *analysis* the materials which enter into the composition of plants, then by *synthesis* offering these materials, and thus satisfactorily ascertaining their individual effect—the science will then be perfect.

CALENDAR OF HORTICULTURE.—JULY.

RETROSPECT.—After the date when the calendar for June went to press, the weather became showery (with, in many counties, severe thunder storms on the 23rd and 24th of May), followed by a most brilliant and sunny season to the 4th of June. As further remarks now would be premature, and a change is anticipated, they are postponed to the turn of days.

VEGETABLE DEPARTMENT.

Turnips.—A full crop for winter is generally sown in open ground, remote from shade of trees. This bulbous crop is of most importance in field culture as food for stock, and as such has attracted the notice of agricultural chemists. By comparing the results of four analyses of the bulbs by Boussingault and Daubeny, I find the average per centage of the ashes from 100 parts of fresh bulbs to be about 3.38; and that from 100 parts of such ash, were obtained, of—

	Bulbs.		Tops (by Way & Ogston).
Potash.....	35.80	.....	15.21
Soda.....	3.30	.....	2.84
Common salt....	3.80	.....	15.30
Lime.....	11.15	.....	28.49
Magnesia.....	4.10	.....	2.81
Per oxide of iron..	4.93	.....	1.68
Silica.....	4.05	.....	3.99
Sulphuric acid....	9.61	.....	8.43
Phosphoric acid..	10.57	.....	6.77
Carbonic acid....	9.86	.....	9.98
Sand and carbon..	4.67	.....	—
Chloride of potas- sium.....	—	.....	5.94

A trifling excess occurs in both, perhaps from absorption of water in the last, and by the total absence

of soda in Boussingault's analysis of the bulb, which thus interferes with the average of the two chemists. However, we discover, great differences in the components of the bulbs and herbage, particularly in the lime and two chlorides. Bones, either as dust or vitriolized, and guano, are theoretically indicated, and (by practice) carbon with a substratum of rotten dung.

Sow early in the month *Cape broccoli*, curled *endive*, *kidney beans*, and *runners*, for the last time, *lettuces*, broad and Flemish *spinach*.

Hoe and thin *carrots* and *parsnips*. Transplant *leeks*, to very rich beds; weed *onions*, and hoe the soil between the rows in dry weather.

Parsley—transplant the most curled in moist weather, in rows, each six inches at least remote from the other: thus fine specimens may be obtained, which will also produce the best kind of seed.

Plant *celery* in prepared trenches, for a full crop.

Cucumbers and *melons*, without heat, will now be coming into full bearing; the shoots (the laterals and fruiting leaders previously stopped) being regularly pegged down. It is always prudent, for melons particularly, to have a frame with lights over the plants, raised some inches from the soil by bricks, placed at the corners to support it.

Mushroom-beds can now be spawned: I again allude to Mr. Williamson's practice, as described many years since in the *Horticultural Transactions*. A common melon-bed is spawned when it is earthed up for the last time. The strong new yellow loam made use of for the melon plant is peculiarly suitable to the mushroom, and if made firm over the spawn (aided by the heat of the bed), it will cause

it to extend itself throughout; and when the melon plants decay in September, the surface is to be cleaned, the glasses put on and kept close. A little gentle shower of rain should, however, be now and then admitted; a renewed moist heat will thus obtain, and a vast crop of mushrooms will appear over every part of the bed. A second crop will arise after the frosts of winter are passed, when the warm spring showers will re-excite the mushrooms.

Broccoli, *cauliflowers*, and all the winter greens are to be planted out in the course of the month; and *cabbage* seed sown about the 25th for coleworts.

Garlic, potato (or underground) *onions*, and *shallots*, are to be raised when the leaves begin to decay, and laid to dry in an airy place; then secured dry and cool for winter.

Sow *radishes*, salading; plant slips of *sage*, and perform all the customary duties either of propagation, or connected with order and regularity, that have so frequently been noticed.

FRUIT DEPARTMENT.

Strawberries.—Begin in earnest to obtain an ample supply of runner plantlets (the *first* from the parents), for forming new plantations, or for potting and transferring to forcing frames. Every string not wanted for these objects may be timely and constantly obliterated.

Look over all the stone-fruit wall trees, remove the superfluous shoots, nail in and secure those retained, and take away superabundant duplicate fruits. *Espalier apple*, *pear*, and *plum* trees, also open dwarf standards, will require corresponding regulations. At the end of July begin to prune back, or snap the projecting shoots of spur-bearing fruit trees, in order to induce fruit-producing buds at their origin.

Vines require a weekly regulation, the object of which is to cut away all useless shoots, to stop at one leaf all the new shoots that proceed from the fruit-bearing laterals; but carefully preserve all the primary leaves in every part of the vines—their functions are essential in every point of view.

Trained *fig*-trees must be kept orderly, and close to the walls; but in localities where the fruit ripens upon open trees (as at the south coast), they require only the obliteration of ground suckers.

Budding of every kind can be safely proceeded with about the end of the month. Destroy wasps, snails, ants, and earwigs.

FRUITS UNDER GLASS.

Vines.—The grapes of the second crop will now be ripening in rapid succession. A dry atmosphere and plenty of air should be attended to, and care taken not to admit rain; which, if July prove showery, and the sliding sashes be opened, might do serious injury. The vines of the first crop, al-

ready gathered, may be permitted to grow at their own free will, to strengthen the trees. Syringing can be resorted to, if the acarus show itself.

Pines ripen in succession: let two of the best suckers be left on the plant. Succession and nursing plants ought to be growing rapidly, and should have air and water accordingly. So much advantage must result from open beds without any pots, the soil warmed by hot water underneath (or, as it may be, by dung chambers under the soil), that we hesitate to say more of pot-culture: plenty of space between plant and plant is an important condition.

Melons grow well and bear fruit without artificial heat; but they ought always to be within pits or frames, and have plenty of night air in hot weather, *Cucumbers* and *vegetable marrow* require little or no covering.

PLANT-STOVE.

Assiduous attention to cleanness is essential. Air in abundance, and a moist atmosphere raised by the copious watering of the floor and paths early in the day, are necessary; and the vigilant eye of the gardener should ever be directed to destroy those numerous insects which disfigure and injure the plants. The dry or succulent house must also be well aired, and so much water given as will encourage growth; at which stage also a moist atmosphere is beneficial, as it conforms to the dictates of nature: perfect aridity at the period of rest and dormancy, is another and important contingency.

In the *greenhouse* and *conservatory* where azaleas and camellias have formed their buds after early excitement, much shading is required; and for the latter a north exposure is to be preferred. It were well to have all houses glazed with a rough or clouded glass that would admit only a softened and diffused light. The direct ray frequently effects sudden injury, and seems to possess no decided advantages.

ORNAMENTAL DEPARTMENTS.

Look over all the flower-borders and parterres, to remove by the scissors or a very sharp knife useless seed-stalks and all decayed portions of the plants. Let nothing be rent off, especially in gathering roses, where it frequently happens that a large member is split, and even a bud at its junction with the stock (if young and tender) torn away. Neatly trim and cut away diseased or ill placed shoots of shrubs; and particularly prune off the seed clusters of rhododendrons, azaleas, and *kal-mias*; they disfigure the plants, and somewhat impede the new growths. Pull up decaying annuals and herbaceous plants: deposit all such matters in the rubbish yard, where, if they are occasionally wetted with house-sewage, a rich vegetable manure will be formed. Support pinks, carnations, and other flowering plants which are apt to fall over,

and become straggling, with several neat sticks, and ties passed round from one to the other. Layer carnations and picotees: in doing this move away some of the old soil around the plants, and substitute a mixture of fine road sand, rich mould, and about one-sixth of the whole of finely sifted old lime-rubbish or powdered chalk. Place this rather dishformed, so that the side shoots may repose on it: then trim off two or three leaves from each: carefully slit the shoot below a joint, to and through the one above that: peg each securely down with a fern peg or slender hook: cover with more of the prepared earth. Water and somewhat elevate each layer, pressing the earth about it on every side. Pipe pinks in a similar soil: choose a shady spot: water and cover with a hand-glass.

Budding roses may commence about the third week. This is a nice operation, the success of which mainly depends upon a clear sight, a light and accurate hand—subject, however, to a growing and sappy state of the annual shoots of the present spring and summer, and the detachable condition of the shield of bark that comprises the bud with its central pith, alburnum, and liber entire. The varieties of the wild dog-rose are more or less arbitrarily adapted to the several varieties of cultivated

roses; but we now hear much of the manietti stock. I am endeavouring to elicit the merits of the theory by experiment.

The usual routine of the gardener's duties must be urged: but these have been repeatedly described.

CLOSING RETROSPECT.

Summer appears to be established after a variety of mutations. Everything was progressing steadily but slowly, in a state of general health, till the visitation of that fierce current of south-westerly wind which commenced on Wednesday, the 12th, and became furious on the 13th. These winds are not uncommon in June: they almost invariably introduce much rain, and in their course burn or scorch vegetation, as if (which by the way may be viewed as a fact) they were a pure electric stream. The effects are now discernible in some hawthorn hedges, and in the destruction of pears, which fall in abundance. Caterpillars abound on the hawthorn, and aphids on the rose-buds and the young shoots.

These light inflictions are of little moment—the general promise is fine. Potatoes are really beautiful; and, if we may believe the prognostics, a warm, husbandman's summer awaits us.

Croydon, June 20.

JOHN TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JUNE.

The weather experienced in the early part of this month was not to say favourable for the growing crops. The somewhat severe frosts of the 14th and 15th materially retarded their progress, and, we regret to say, produced much damage to the early as well as the late planted potatoes, especially in Essex and some parts of Kent. Since the date last above mentioned, the atmosphere has been exceedingly hot and forcing; the hay-harvest has been rapidly proceeded with in the whole of the early districts; and the wheats, including all spring corn, have been greatly benefited. In some quarters wheat is now in full ear; and from nearly all parts of the kingdom our accounts agree in stating that a full average crop may be safely calculated upon. Of course, much will depend upon the state of the weather during the next two months, but present appearances are decidedly in favour of a good yield. A few continuous showers of rain would now act beneficially upon barley, oats, beans, and peas, notwithstanding that much moisture would be prejudicial to the interests of those en-

gaged in hay-making. Much difference of opinion exists as regards the hay-crop; but we are inclined to believe that it will turn out good, both as to quantity and quality.

Notwithstanding that the aggregate sales of English wheat this season have been considerably in excess of those of 1849, say from 400,000 to 500,000 quarters, including private transactions, the stocks in the hands of the farmers are still, unquestionably, extensive for the time of year. This fact, together with the steady and continuous imports of foreign grain and flour, has produced much inactivity in the demand throughout the month; nevertheless, prices have been well supported in every instance. Free-traders have informed us that very little grain will reach us during the remainder of the year from abroad, but experience has taught us that low prices will not have the effect of keeping the foreigner out of our markets. Since the beginning of the year, the total arrivals have been at the rate of nearly 12,000,000 quarters annually—a positive proof, if proof were wanting, of the distressed state of agriculture abroad. We are now within six weeks of harvest; and on the continent it will be

commenced about the latter end of July. We should not, therefore, be surprised to find *new* foreign wheat, barley, and oats, in our markets before the latter end of September. From the United States, however, very little grain, except Indian corn, can arrive hither, owing to a scarcity being complained of in some quarters.

That the quantity of live stock at this time in most of our large grazing districts is large, must be evident from the immense supplies brought forward in Smithfield and elsewhere. Prices have given way quite 10 per cent., with a very inactive demand. From abroad the imports have been steadily on the increase; and the arrivals of cured and other provisions, including fruit and vegetables, from the continent, have been unusually large. Our own growers and producers are literally driven out of the markets, except at foreign prices. Nearly 4,000 tons of new potatoes have already reached us from Holland, France, and Belgium; and an intelligent correspondent at Rotterdam intimates that at least 150,000 tons will arrive hither during the next six or eight months. Up to the present time no complaints have reached us from abroad respecting potatoes; and the supplies at hand in the metropolis give earnest of a good crop.

The early fruits have gone on well, and the markets are very extensively supplied with them. The produce of apples promises to be much larger than last season.

The quantity of English barley remaining on hand is exceedingly small—smaller, indeed, than since 1847; hence, nearly the whole of the supplies of that grain derived from abroad have passed into consumption. That of oats is likewise small, and the consumption has fallen chiefly upon foreign qualities.

The arrivals of Indian corn having considerably increased, prices have given way 1s. to 2s. per 480lbs., although the demand on Irish account is good.

The continued low prices have prevented any shipments of grain to England either from Ireland or Scotland, worthy of notice. Not a single quarter of oats has arrived from the former country into London. Surely free-trade has done but little good to the Irish cultivators, who are now shut out from what was once a profitable market for them.

The markets for the sale of wool have continued steady. Public sales of 46,000 bales of colonial are in progress, and their result is expected to be very satisfactory.

Present appearances indicate a good growth of hops. Our accounts state that scarcely any fly has been observed in the plantations. The duty has, therefore, been done as high as £165,000.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since we last wrote, the supplies of both English and Foreign stock on sale in Smithfield have been on the increase and of full average quality for the time of year. Owing to the hot weather, those of slaughtered meat exhibited in Newgate and Leadenhall have fallen off: yet they have proved quite equal to the demand. Both beef and mutton have met a very heavy demand, at a decline in the quotations of quite 2d. per 8 lbs. without clearances being effected. The large number of foreign calves brought forward has reduced the value of inferior veal down to 2s. 6d. per 8 lbs.! At that low figure the butchers have purchased with extreme caution. The provincial cattle markets have been equally inactive, notwithstanding the abundance of food in the country, which has enabled the stock to fare remarkably well. We hear of very few losses being sustained by the epidemic, and we are glad to find that no serious cases of foot-rot have presented themselves.

The following supplies were brought forward in Smithfield:—

Beasts	16,608 Head.
Cows	448
Sheep and lambs	182,620
Calves	2,453
Pigs	2,475

SUPPLIES AT CORRESPONDING PERIODS.

June	Beasts.	Sheep & lambs.	Calves.	Pigs.
1844	13,290	169,800	1,840	2,600
1845	13,476	131,390	2,212	2,345
1846	15,284	163,080	1,312	2,580
1847	16,222	148,660	3,064	2,488
1848	17,452	152,730	3,846	2,641
1849	15,899	153,320	2,667	2,322

The annexed statement shows the quarters from whence the principal portion of the home bullock supplies were received:—

	Head.
Norfolk, Suffolk, Essex, and Cambridgeshire	10,000
Western and Midland Counties	1,200
Other parts of England	1,450
Scotland	1,200
From Ireland, 124 beasts, 461 sheep, and 99 calves have come to hand by sea.	

The imports from abroad have been as under:—

Beasts	1,515 Head.
Sheep	7,398
Lambs	302
Calves	1,600
Pigs	125

COMPARISON OF CORRESPONDING PERIODS.

	June 1847.	June 1848.	June 1849.
Beasts	4,594 ..	2,044 ..	1,300
Sheep	29,430 ..	9,591 ..	7,631
Lambs	995 ..	74 ..	386
Calves	844 ..	1,692 ..	1,459
Pigs	— ..	— ..	2

Beef has sold at from 2s. 4d. to 3s. 6d.; mutton, 2s. 6d. to 3s. 10d.; lamb, 4s. to 5s. 2d.; veal, 2s. 6d. to 3s. 4d.; and pork, 3s. 2d. to 4s. per 8lbs. to sink the offals.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
May 21	29.71	29.70	50	72	60	Northerly	gentle	fine	sun	fine	dry
22	29.67	29.53	53	67	57	Every way	gentle	cloudy	fine	fine	rain
23	29.53	29.50	53	67	55	S. West	gentle	cloudy	sun	fine	sprinkle
24	29.50	29.50	46	61	54	E. to S. W.	lively	cloudy	cloudy	fine	showery
25	29.50	29.52	51	63	53	S. West	brisk	fine	cloudy	cloudy	showery
26	29.61	29.70	52	62	53	W., S. W.	forcibl.	fine	sun	fine	showers
27	29.70	29.75	53	62	54	S. West	lively	cloudy	sun	cloudy	showers
28	29.98	30.14	50	65	55	W. by N., S.	lively	fine	fine	fine	showers
29	30.20	30.15	52	68	62	Southerly	gentle	fine	sun	fine	dry
30	30.08	30.00	56	66	59	Easterly	gentle	fine	cloudy	fine	dry
31	30.09	30.20	54	70	59	Easterly	lively	fine	sun	fine	dry
June 1	30.26	30.33	54	67	59	N. Easterly	lively	fine	sun	fine	dry
2	30.35	30.36	49	73	59	Easterly	lively	fine	sun	fine	dry
3	30.35	30.30	51	68	56	S. East	lively	fine	sun	fine	dry
4	30.29	30.10	50	69	59	S. Easterly	lively	fine	sun	fine	dry
5	30.04	29.80	51	73	60	S. Westerly	variab.	haze	sun	cloudy	dry
6	29.73	29.56	55	60	51	S. West	brisk	cloudy	cloudy	fine	sprinkle
7	29.55	29.50	50	66	—	W. by South	brisk	fine	fine	fine	showers
8	29.80	30.00	53	69	—	W. by North	gentle	fine	sun	fine	showers
9	30.00	30.16	48	70	—	W., S. W.	gentle	fine	sun	fine	dry
10	30.10	29.90	55	74	—	S. by E., by W.	gentle	fine	sun	fine	dry
11	29.70	29.73	53	75	—	N. Westerly	lively	fine	sun	fine	dry
12	29.72	29.72	53	68	—	West	brisk	fine	cloudy	cloudy	dry
13	29.71	29.67	57	67	—	S. Westerly	forcibl.	fine	cloudy	fine	showers
14	29.50	29.55	—	—	—	S. by E., W.	moder.	cloudy	cloudy	fine	rain
15	—	29.80	—	—	53	N. N. by E.	gentle	cloudy	cloudy	fine	rain
16	30.00	30.02	38	62	52	N. by E., S. E.	gentle	fine	sun	fine	dry
17	30.03	30.12	45	65	55	Every way	gentle	fine	sun	fine	dry
18	30.20	30.30	45	68	62	W., N. W.	gentle	fine	sun	fine	dry
19	30.34	30.34	56	73	63	Northerly	gentle	fine	sun	fine	dry
20	30.33	30.20	55	75	63	S. West	gentle	fine	sun	fine	dry

ESTIMATED AVERAGES OF JUNE.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.46	29.60	90	37	58.7

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
67.7	53.1	60.4

WEATHER AND PHENOMENA.

May 21—Warm and clear sun. 22—Early showers; fine day. 23 to 28—Showery at times. 29—Change of weather, summer-like and sunny. —[Oaks far in advance of ash trees.]

LUNATION.—Full moon 26th day, 0h. 8m. morning.

June 1—Clear air, hot sun; a few spots on the disk about this time. 2—Cool breeze, lulling at sunset. 3—Cloudless. 4—Cirrus form; a parhelion before sunset. 5—Changeable; cirro-cumulus and stratus. 6—Showers at a distance; chilly. [N.B. From 7th to the 15th, inclusive, absence precluded the regular instrumental observations.]

7—Occasional showers and gleams. 8—One shower, otherwise fine. 9, 10, 11—Summer; increasingly warm. 12—Clouds form; rainy appearances. 13—A shower. 14, 15—Very cold, much steady rain; fine evening. 16—Cold morning; sunny improved day. 17, 18—Fine, sunny, hay weather; wheat, oats, and barley seen in ear. 19—Perfect summer; no solar spot. 20—Very warm; solar halo; mass of clouds.

LUNATIONS.—Last quarter, 3rd day, 3h. 47m. morning; new moon, 10th day, 7h. 20m. morning; first quarter 16th, 10h. 22m. p.m.

REMARKS REFERRING TO AGRICULTURE.—The weather has been favourable as a whole, yet the occasional very cold nights have retarded, and the fierce S. W. wind of three days, which introduced the bitter cold north-easterly rain of the 14th instant, cut up and blighted some of the hedges and hardier fruits. A morning hoar frost was perceived in some parts on the 16th. Hay progresses finely. Wheat and the spring corn are coming into ear. A change of weather is, however, threatened.

Croydon.

J. TOWERS.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BEDALE FORTNIGHT FAIR, June 18.—A moderate supply of fat beasts, and a large number of buyers, which caused the stock to sell readily, at prices a little better than last fortnight, though nothing quotable. Mutton sold same as last market. Beef, 5s. 3d. to 6s. 3d. per stone; mutton, 4½d. to 6d. per lb.

CHIPPENHAM MONTHLY MARKET, June 14.—Ninety-six tons of cheese were pitched, and the sale was very good; broad doubles, 30s. to 36s. per cwt.; old ditto, 40s. to 46s. ditto; prime Cheddar, 56s. to 63s. ditto; thin, 30s. to 38s. ditto; loaves, 50s. to 56s. ditto; skim, 16s. to 22s. ditto. Beef, 8s. 6d. to 9s. per score; mutton, 5d. to 5½d. per lb.; lamb, 7d. ditto.

DROITWICH FAIR (Monday last).—Fat cows were worth from 4½d. to 5½d. per lb.; there were but few of good quality, and those met with a ready sale. Good lambs, of which there was a very small supply, were much sought after, and were worth 6½d. per lb., but inferior ones, which formed the greatest portion, were much lower in price. The store cattle were mostly driven away unsold.

NEWTON-STEWART CATTLE MARKET.—There were about 430 cattle shown to-day, principally two and three-year-old Galloways, with a portion of stirks. The demand was good, but prices as low as ever. A large proportion of the stock changed hands, a circumstance which seldom occurs with low prices. Good two-year-olds were sold at £6 10s., £6 12s. 6d., and £6 17s. 6d., and several lots brought a much lower figure; £8 was asked for one lot, probably the best in the field, but they remained unsold when the market was very near a close. According to the opinion of one who ought to be a judge, cattle were sold at as low prices to-day as have been witnessed in a Newton-Stewart market for a considerable period.

NORTHAMPTON FAIR, June 19.—There was rather a short supply of fat sheep, which caused a brisk trade. Good wether mutton made from 3s. 4d. to 3s. 6d. per 8lbs. The supply of lambs was also limited, and made from 3s. 10d. to 4s. 4d. per stone. Beef was scarce; good made from 3s. 6d. to 3s. 8d. per stone. Most of them were sold, there being a full attendance of buyers from Coventry, Birmingham, and other places. The supply of stores, which consisted chiefly of Devons and Welsh beast, with a few lots of Irish, was also limited. The supply of milching cows was scanty, but buyers being scarce little was done in them.

ROCHDALE FAIR, June 17.—We had a great attendance, and the best calving cows were rather higher in price than they were a month ago. Drapes, and other descriptions of horned beasts, were a trifle higher in price, and a full average number were disposed of.

SHEPTON-MALLET FAIR was well supplied with all kinds of stock, which met a ready sale, as graziers and butchers attended from long distances. Fat beef sold at from 8s. 6d. to 10s. per score; mutton 5½d. to 6d.; lamb, 6d. to 6½d. per lb.; some of which were very good, especially those of Messrs. Welch and Richmond's. Cows and calves sold pretty well, as did also barreners. Pigs were plentiful, and sold rather brisker than of late, although prices were unaltered. The horse fair was pretty well supplied, amongst which were some good colts, which sold at high prices. There were also some pretty good nag horses, many of which changed hands; and, on the whole, it was a better selling fair than has been held in this neighbourhood for some time, and promises to become a fair of note.

SHREWSBURY FAIR.—There was a large supply of fat cattle, with a good demand, and a clearance; prices obtained may be quoted at 5d. per lb., some few a shade more. Fresh store cattle sold freely at improved prices, also the best sorted cows and calves. In the sheep market there was a very extensive supply, most of which were sold, fetching from 5d. to 5½d. per lb., the latter figure only obtained for smart light-weighted wethers. Lambs were eagerly bought up from 6½d. to 7d. per

lb., many more being required than were brought for sale. Pigs were sold much about the same as of late; there was a great number at market.

TAUNTON FAIR, (Monday last).—There was a good supply of cattle (horses excepted), but the sale was rather dull, and the following were the average prices:—Cows and calves, £8 to £14 each; best three-year-old steers, £24 to £26; old oxen, prime quality, £32 to £34, and £36 the pair; fat beef 8s. 6d. per score; fat sheep, £2 10s. each; sheep out of wool 5d.; sheep in wool, 6d. per lb.; fat lambs, 20s. to 23s. each. In the horse fair there were few animals worthy of notice, as they were mostly of the lower order, and few sales only were effected.

THORNE FAIR (Tuesday last) was exceedingly well attended. The supply of stock was large, and, consequent upon the late advanced rates elsewhere, there was a brisk sale upon better terms.

YORK FORTNIGHT FAIR, June 20.—We had a good supply of fat beasts, which met with a ready sale at from 5s. 6d. to 6s. per stone, the market being well attended with buyers. A large number of fat sheep sold at from 6d. to 5½d. per lb. The quantity of lambs shown was large, and the price 6d. per lb. A thin supply of lean beasts sold at rather better prices.

IRISH FAIRS.—**INISTIOGE (Monday)** was poorly supplied with stock, and badly attended by buyers, which was consequent upon the occurrence of a fair in New Ross the same day. There were neither milch cows, fat cows, fat sheep, nor fat pigs. Strippers sold at from £5 10s. to £6 10s.; two-year-olds, £4 10s. to £5 10s.; yearlings, £2 10s. to £3 10s.; lambs, 12s. to 14s. each; store pigs, 45s. to 50s.; bonhams, from 24s. to 32s. per couple. There were no horses. **CALAN (Wednesday)** was of an encouraging character, and much business was done. Fat cows brought from £10 to £11 10s. each; new milch cows, £9 10s. to £11; strippers, £6 to £7 10s.; two-year-olds, £6 to £7; yearlings, £3 to £4; fat sheep, 32s. to 38s.; hoggets, 32s. to 36s.; lambs, 15s. to 18s.; fat pigs, 44s. per cwt.; stores, 42s. to 48s.; bonhams, £1 to £1 6s. per couple. There were not many horses disposed of. **BALLYBROOD, Wednesday.**—Mutton rated at 5½d. per lb.; beef, 42s. per cwt., sinking offal. Milch cows, £7 10s.; strippers, £5 to £7; yearlings, £2 to £4 10s. each. There was a great scarcity of fat stock. **CREGGS, on Thursday,** was an exceedingly good one, and a great quantity of cattle exchanged owners. **MOUNT TALBOT, on Wednesday,** was also a very good one. Cows, heifers, fat sheep, and good lambs went off well. Indeed, the rain, with which we have been blessed up to this, has increased the quantity of grass to such a degree that farmers are obliged to increase their stock. Wool is in great demand here, at 16s. 6d. to 17s. per stone. Nothing can equal the luxuriant appearance of the crops.—*Roscommon Journal.* **DERBY.**—Monday, as regards the display of stock and sales, was far behind many of our former June fairs. £18 was the highest price obtained for bullocks, and only one went at that. Of cows there was an average exhibition, and prices low. Sheep a limited supply; prices ranged downwards from £2. Thirteen Pigs were sold at £4 each; there were no fat pigs offered for sale. Lambs brought from £1 down to 10s. The supply of horses was good, but rather deficient in quality. There were, however, a few fine animals offered for sale, and good three-year-olds brought £30.—**CARLOW, (Saturday last).**—The show of stock was small, but of good quality. Fat stock sold high. Milch cows from £7 to £9; three-year-old heifers (fat) £8 to £9; stores, £4 to £6; four-year-old heifers, £4 to £7; two-year-olds, £6; yearlings, £3 to £4; pork, 42s. to 44s. per cwt.; sheep, 40s. to 42s. Mr. Dowse sold a lot of ewes and wethers at 42s. each. Lambs, 18s. to 20s. Four Kerry heifers, three years old, belonging to R. Clayton Browne, Esq., brought £32. Wool, 15s. to 16s. 6d. Prices were considered remunerative.—*Carlow Sentinel.*

REVIEW OF THE CORN TRADE DURING THE MONTH OF JUNE.

That a reaction is taking place in public opinion in regard to free trade even the most biassed mind must now admit. Not only the owners and occupiers of land, but the great bulk of those employed in commercial and many branches of manufacturing industry, have discovered that the unrestricted admission of foreign products into Great Britain is not exactly the best mode of giving remunerative employment to our industrial classes; and that to impoverish our farmers and their dependants must be followed by so great a falling off in the home demand for textile fabrics, and other manufactures, as wholly to counteract the expected advantages which it was believed would be reaped from increased exports. There is perhaps little probability of any immediate return to protective duties, but matters are steadily working in that direction; and there is every reason to suppose that whenever a general election may occur, and the voice of the country be fairly called upon, the decision will be against a continuance of the legislative policy of the present cabinet. Meanwhile it behoves all those who conscientiously believe that to retrace our steps would be the means of adding to the nation's prosperity, to keep themselves ready to assist in the struggle to re-establish a fair protection to native industry.

Not the slightest improvement has taken place in the general tone of commercial affairs since our last; money is abundant, but no profitable employment can be found for the same, and complaints of a want of activity in business are almost universal with all classes of the community. The corn trade has felt the effect of this general depression; and, though supplies have been moderate, the demand has throughout the month been slow for most articles. The weather has, of course, had more or less influence; but though the changes of temperature have been great, prices of grain have not fluctuated much. The month of June commenced favourably; and vegetation, which had been much retarded by the want of genial warmth during part of May, speedily showed the beneficial effects of hot sunshine and occasional showers. The nights were, however, cold till about the middle of the month; and on the 15th instant so severe a frost was experienced as to cause some uneasiness to be felt in regard to its effects on potatoes. These fears were, however, of short duration, the weather having since been of a character to repair the mis-

chief which was unquestionably done to the stalk and leaves, but which fortunately did not extend to the roots. The mean range of temperature having been low throughout the spring, the season is about a fortnight later than last year, and there is not much prospect of harvest being commenced till August; indeed we are inclined to think that little corn, excepting rye, will be ready to cut until about the middle of that month. The wheat plant is hardly yet out in ear in the backward parts of the kingdom; and even in the most favoured localities it is not so forward as at the corresponding period of 1849. Beyond this there is little to complain of, as the plant wears a healthy appearance, is thick on the ground without being rankly luxuriant, and altogether affords promise of a plentiful return should the remainder of the summer prove propitious. In reference to the spring-sown crops it is not so easy to obtain accurate information, attention being so exclusively directed to the wheat crop as to cause other articles to be but little noticed in the generality of agricultural reports. The seed having been committed to the soil under very favourable auspices, and the first stages of its growth having been favoured by showers in the early part of April, both barley and oats came up evenly and strong; the cold subsequently experienced checked the growth; still nothing has hitherto occurred, if we except the extreme heat of the last week or two, to lead to the belief that in proportion to the breadth sown the produce of these kinds of grain, or of beans or peas, will fall short of an average. That all kinds of spring corn and pulse now stand in need of moisture cannot be questioned, but what would benefit these crops would perhaps do more or less mischief to wheat.

We have from time to time heard rumours of symptoms of the potato disease having manifested themselves, but these have been of so vague a character as to attract little attention. Our own impression is that, so far as a judgment can be formed thus early, everything is going on remarkably well, and that the prospects for the future are decidedly promising in reference to the probable supply of home-grown food; but it still wants six weeks or two months to harvest, and it would therefore be rash to speak positively as to the range prices may take.

The changes in quotations have been very slight since the close of May; and we are inclined

to think, if nothing untoward should occur to cause uneasiness in reference to the growing crops, that next month will pass away without much alteration.

The quality of last year's growth of wheat is very fine; and those farmers who have any quantity left (being mostly men in a position to hold) are not disposed to force sales at the present low rates so long as any uncertainty attaches to the result of the harvest. For some time past the deliveries from the growers have been very small, which has counteracted the effects of the fine weather, and prevented prices giving way. That some holders may lose confidence, if all should progress favourably during next month, is not unlikely; but on the whole we do not look for any immediate decline in the value of wheat, and stocks of all kinds of spring corn are so nearly exhausted that we are more disposed to expect a rise in prices of barley and oats than any reduction. What may occur subsequent to harvest it is impossible to foresee; but of this we feel quite satisfied, that if (as there is reason to believe will be the case) the crops yield a good return in this country, and potatoes escape the disease here and in Ireland, the value of all agricultural produce would rule very low in the autumn, unless something should meanwhile be done to check importations from abroad. Notwithstanding the want of encouragement to consign to Great Britain, and the exhaustion of old stocks abroad in consequence of the immense exports to England in 1848 and 1849, the supplies of foreign grain and flour into the United Kingdom have been very liberal this year. Since the opening of the Baltic navigation upwards of 1,000,000 qrs. were received during the month ending 5th May, and 800,000 qrs. of foreign corn and pulse were entered for home consumption the month ending 5th June.

The shipments from Danzig, and some of the other leading ports, have lately been on rather an extensive scale; and there must at present be a considerable quantity on passage to this country. There is consequently little chance of our stocks of old wheat running short, even if harvest should be delayed somewhat beyond the usual period. At present stocks in granary are not heavy, but most of the large millers, and many of the principal dealers, have fair quantities on hand; it having become the fashion of late for parties to buy through the agents established here, who represent foreign houses, and import direct without the employment of a factor. It is therefore difficult to arrive at anything like a correct estimate of the quantity of foreign corn in the country; but we are inclined to think that stocks are not so short as is generally supposed, which opinion is grounded on the extent

of the foreign importations and the acknowledged productiveness of the harvest of 1849. It is, however, certain that the quantity of really good fresh wheat on hand is comparatively trifling; a very large proportion of the recently-received supplies from abroad having come to hand in indifferent condition.

Farmers are now busily engaged with hay-making; immediately round about the metropolis a great portion has already been secured in excellent order, and both in point of quantity and quality the result is far better than from the bare appearance of the meadows in May could have been calculated on. In the North cutting has only just been commenced, and much must therefore still depend on the weather as regards the general crop.

We shall now proceed to give our usual retrospect of the trade at Mark Lane during the month, which will be found to bear out what we have already said with regard to business in the provincial markets, viz., that though sellers have been firm, the demand for most articles has been too slow to admit of any advance being established.

The supplies of home-grown wheat into the port of London have been very small—scarcely averaging 2,500 qrs. per week. Nor have the arrivals by railway been on a more liberal scale; and the millers having found it absolutely necessary to use a moderate quantity of fresh English wheats to work off their foreign, they have had to comply with the prices asked by factors.

We have had hardly any wheat from Cambridgeshire, Lincolnshire, or Norfolk—the shippers on the east coast having found it more to their advantage to ship northwards than to London, and we have been dependent almost wholly on Essex and Kent for our home supply.

Not the slightest change occurred in quotations until the 10th inst., when, in consequence of the extreme insignificance of the quantity on sale, and the appearance of buyers on Yorkshire account, an advance of 1s. per qr. on previous rates was, in partial instances, paid for the finest qualities of red—43s. per qr. being realized for choice samples weighing 63 lbs. per bushel. About this period the weather assumed a settled appearance, and the temperature having risen materially in the interval, business was very heavy on the succeeding Monday; still the advance was not lost, nor were lower terms accepted on the 24th, though increased caution was exercised by purchasers on the latter occasion.

The demand for red wheat has throughout the month been more active than for white, and the latter is scarcely worth as much at present as it was at the close of May. This may be accounted for by the fact that a good many cargoes have

lately been received from Danzig, and these having come to hand in better order than the generality of the red wheat from abroad, there has been less necessity for mixing with English in the one than in the other case.

The transactions in foreign wheat have been on quite a retail scale since our last. The country demand has at no time been active, and, owing to the reason already referred to, viz., the imports direct by millers, the local demand has been much less extensive than would otherwise have been the case; and last, though not least, the constant and regular supply of French flour has deprived the metropolitan millers of a certain amount of trade. It would be useless to particularize the operations of separate days—the one having been precisely similar to that of the other. Buyers have in general objected to take a bushel more than needed for immediate use; and though the arrivals from abroad have not been by any means heavy, importers have been under the necessity of landing a portion, owing to the impossibility of finding purchasers disposed to take cargoes from on board ship. In this position of affairs, factors have refrained from attempting to force business, and quotations have remained very nearly the same as they were at the end of last month—say, 38s. to 40s. for moderately good, and 41s. to 43s. for the finer kinds of red, whilst for Danzig from 42s. up to 46s. per qr. has been realized in small quantities. There is some choice Rostock on the market held 1s. to 2s. per qr. higher than the top price named for red, and really fine high mixed Danzig may, in some cases, have reached 48s. per qr.; but these prices cannot be taken as a criterion of the rates at which any quantity could be placed.

The top quotation of town-manufactured flour has not varied; indeed, the millers have had hard work to buy fine wheat so as to leave them a profit—the finer kinds having commanded relatively higher rates than the commoner descriptions. Good fresh country flour has sold readily, and the receipts from Norfolk having been scarcely equal to the demand, the value of the most approved marks has rather crept up. French flour, having been offered at terms relatively below what the English manufacturers have been enabled to take, has commanded a fair share of attention, and stocks in warehouse have diminished, notwithstanding the fresh imports. Latterly, 28s. to 29s. has been paid for the commoner sorts, and 31s. to 32s. for good serviceable parcels. The sudden setting in of the hot weather in the middle of the month caused a considerable quantity of the foreign flour on the wharfs to go out of condition, which increased the value of all fresh-ground sorts, and

caused the slight advance which took place in prices of Norfolk households.

The arrivals of English barley have been perfectly insignificant during the month; but all the leading maltsters having left off work for the season, the smallness of the supply has been little felt. The business done in the finer sorts has been of so little consequence as to render it difficult to quote the precise value, but we believe that the prices last paid was about 25s. per qr. for superior qualities the growth of Kent. The supplies of this grain from abroad have been tolerably good, 20,000 qrs. having been received at this port during the first three weeks of the month. Besides a good local inquiry, we have had a steady country demand; and though sellers have been unable to establish any advance, they have succeeded in obtaining rates quite equal to those current at the close of May. The extreme heat experienced since the 16th instant is supposed to be acting somewhat detrimentally on the growing crops of spring corn, and holders of barley have therefore, within the last week, exhibited additional firmness, good heavy parcels having been held at 18s. to 19s. per qr., and other descriptions at proportionate rates.

Malt has not varied in value, and buyers have conducted their operations with considerable caution.

The receipts of home-grown oats into the port of London have been trifling in the extreme, only a few hundred quarters per week (including the Scotch) having come to hand: the arrivals from abroad have meanwhile fallen off considerably, and only a comparatively small proportion of what has come to hand has consisted of unsaleable qualities, the greater part of the cargoes having become heated on the voyage. The market is, consequently, bare of really good fresh oats, and such are likely to remain scarce up to harvest. The moderate character of the arrivals, and the idea that the dry hot weather may be doing injury to the growing crop, have had the effect of causing prices to tend upwards; but the large dealers have at no period of the month bought freely; and consumers having declined taking more than required for immediate use, the transactions have not been by any means extensive. Tolerably good Danish and Swedish oats may now be quoted at 15s. 6d. to 16s. 6d., and fine Dutch Polands 17s. to 18s., whilst really fresh English or Scotch feed would command 20s. to 21s. per qr.; indeed, the last-named price was paid on the 24th instant, for a lot or two from Kent, and a larger parcel from Lincolnshire, weighing from 42 to 44 lbs. per bushel.

Beans were very dull of sale in the early part of the month, and their value had a downward ten-

gency; but within the last week the demand has rather improved, and prices are not at present lower than they were at the end of May.

Peas of home growth have come sparingly forward, and the receipts of the article from abroad have been moderate. The crop certainly stands much in need of moisture, and holders have lately assumed a firmer tone, the best white boilers, such as were obtainable at one period at 25s., having recently been held at 26s., and even 27s. per qr. No change has taken place in the value of feeding Peas.

The demand for Indian corn on Irish account having subsided, the article has excited little attention, and we have heard of very few sales of floating cargoes during the last week or two. At Liverpool the article is still worth 29s. to 30s. per qr.

Before concluding, we shall briefly notice the position of affairs at the chief markets abroad.

The advices from North America are of precisely the same character as before. Very small supplies of flour and wheat appear to have been received from the interior at the ports on the coast, and though there had been no demand for shipment to Europe, the quantity required for home consumption, together with occasional purchases for California, had kept stocks low and prices high. It is clear, therefore, that no supplies of any consequence will reach us from the other side of the Atlantic, except of Indian corn from some of the southern states.

It is, however, more than probable that the north of Europe will be enabled to furnish us with fully as much Wheat, and France with all the foreign flour, we are likely to require. Notwithstanding the close approximation of our prices to the quotations at most of the leading continental ports, the rates asked by foreign merchants have been so high as to leave little margin for profit.

At Danzig really fine high mixed Wheat was, according to the most recent accounts, still held at 42s. to 44s., moderate good qualities at 38s. to 40s., and the light and inferior kinds at 36s. to 37s. per qr. free on board. Freight to London was about 3s. per qr., and to other British ports in proportion, which, with sound dues, insurance, &c., would bring the price here fully up to the present value at Mark Lane; still purchases were being made on English account week after week, to the extent of 10,000 to 12,000 qrs.

At most of the Lower Baltic ports from which we are accustomed to receive the best red wheat, stocks are reduced into a very narrow compass; still occasional shipments are made from Stettin, Rostock, &c.; and from Hamburg, Rotterdam, Antwerp, and the ports along the coast of France we may also calculate upon some further supplies;

though it must be confessed that the chances of deriving benefit by consigning to the British markets are at present very slight.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter	
	OLD.	NEW.
WHEAT, Essex and Kent, white	40 to 47	40 to 47
Ditto, fine selected runs	—	46 48
Ditto, red	37 38	39 41
Ditto, extra	38 40	41 42
Norfolk, Lincolnshire and Yorkshire ..	—	37 40
Ditto, white	—	40 42
BARLEY, English, malting and distilling ..	—	23 25
Ditto, Chevalier	—	26 27
Ditto, grinding	—	19 21
MALT, . . . Essex, Norfolk and Suffolk	43 45	44 48
Kingston, Ware, and town made	45 52	48 54
OATS, Essex and Suffolk	—	16 17
Lincolnshire and Yorkshire (Polands) ..	—	16 18
Ditto, feed	—	15 17
Devon & West Country, feed	—	14 16
Northumberland and Scotch, feed	—	17 22
Dundalk, Newry, and Belfast, potato ..	—	16 17
Limerick, Sligo, and Westport, potato ..	—	16 18
Ditto, feed	—	15 16
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	14 14
Ditto, white	—	14 15
Galway	—	12 13
BEANS, Mazagan	24 26	22 24
Tick	24 27	24 26
Harrow	29 31	27 28
Pigeon, Heligland	31 36	28 30
Windsor	—	24 26
Long pod	—	24 27
PEAS, non-boilers	—	23 24
White, Essex, and Kent, boilers	—	25 27
Ditto, fine Suffolk	—	26 28
Maple	—	24 26
Hog and grey	—	23 25
FLOUR, best marks (per sack of 280 lbs.) ..	—	32 37
Norfolk and Suffolk, ex-ship	—	27 32
RYE	—	20 22

FOREIGN GRAIN.

	Shillings per Quarter.	
	OLD.	NEW.
WHEAT, American, white	37 to 41	—
Canada	33 41	—
Dantzic and Königsberg	43 45	—
Dantzic, fine white, extra quality	45 49	—
Stettin and Hamburg	37 39	—
Danish	33 37	—
Rostock, Pomeranian and Rhine	33 42	—
French and Belgian	35 40	—
Mediterranean, Odessa, and St. Petersburg ..	34 37	—
Black Sea (nominal) hard to soft	32 36	—
Buck or Brank	21 23	—
BARLEY, malting	20 22	—
Grinding and distilling	17 18	—
Hamburg, Dantzic, Königsburgh, and Riga ..	17 19	—
Danish, Mecklenberg, and Pomeranian	17 18	—
OATS, Dutch, brew. Poland, Friesland, and Groningen	17 19	—
Danish and Swedish	15 17	—
Russian	15 17	—
BEANS Small	22 26	—
Egyptian	18 20	—
PEAS, white boilers	21 24	—
Yellow ditto	24 27	—
Non-boilers	22 24	—
MAIZE, white	29 30	—
FLOUR, American, sweet	21 23	—
Ditto, sour	20 23	—
Canadian, sweet	21 23	—
Ditto, sour	20 21	—
French, per sack	27 32	—
RYE MEAL (per ton)	£6 6s. to £6 10s.	—
INDIAN CORN MEAL (per brl. of 196 lbs.)	nominal	—

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
May 18, 1850..	39	7	22	5	15	5	21	7	25	6	24	11
May 25, 1850..	40	7	22	10	16	3	22	4	26	4	25	6
June 1, 1850..	40	2	23	0	15	11	22	0	26	11	26	2
June 8, 1850..	39	8	22	4	16	7	23	7	27	0	26	8
June 15, 1850..	39	11	21	9	16	11	22	8	26	10	27	3
June 22, 1850..	40	5	22	8	16	10	22	6	26	7	26	9
Aggregate average of last six weeks	40	0	22	6	16	4	22	5	26	6	26	2
Comparative ave. same time last year	44	6	27	3	17	11	25	11	31	0	31	3
DUTIES.....	1	0	1	0	1	0	1	0	1	0	1	0

LONDON AVERAGES.

	£	s.	d.		£	s.	d.
Wheat.. 4,556 qrs.	2	3	4	Rye.... — qrs	0	0	0
Barley.. 135	1	4	4	Beans.. 411	1	6	0
Oats .. 191	0	18	2	Peas ..	0	4	4

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's Gazette.				Averages from the corresponding Gazette in 1849.			
	Qrs.	s.	d.		Qrs.	s.	d.
Wheat .. 103,816 ..	40	5		Wheat .. 78,648 ..	44	6	
Barley .. 3,242 ..	22	8		Barley .. 1,506 ..	26	5	
Oats 9,902 ..	16	10		Oats 11,854 ..	18	9	
Rye 52 ..	22	6		Rye 155 ..	25	9	
Beans 3,813 ..	26	7		Beans 1,807 ..	30	10	
Peas 573 ..	26	9		Peas 261 ..	31	5	

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING JUNE 15, 1850.

PRICE.	May 11	May 18	May 25	June 1.	June 8.	June 15.
40s. 7d.	..	..	..	..	..	..
40s. 2d.	..	..	..	..	..	..
39s. 8d.	..	..	..	..	..	..
39s. 7d.	..	..	..	..	..	..
38s. 0d.	..	..	..	..	..	..
39s. 11d.	..	..	..	..	..	..

ACCOUNT SHEWING THE QUANTITIES OF GRAIN AND FLOUR IMPORTED INTO THE UNITED KINGDOM DURING THE MONTH ENDED 5TH JUNE, 1850, THE QUANTITIES ADMITTED FOR HOME CONSUMPTION DURING THE SAME MONTH, AND THE QUANTITIES REMAINING IN WAREHOUSE AT THE CLOSE THEREOF.

Species of Grain.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
Wheat, from British Possessions	qrs. bush. 2402 7	qrs. bush. 2402 7	qrs. bush. 40 6
Barley, do.	—	—	—
Oats, do.	—	—	—
Peas, do.	—	—	—
Beans, do.	—	—	—
Maize or Indian Corn, do.	900 0	900 0	—
Wheat, foreign	334050 7	334745 1	17147 1
Barley, do.	129603 6	129633 7	922 1
Oats, do.	114151 1	114162 3	1203 4
Rye	26700 2	26800 2	100 7
Peas, do.	16829 0	16829 0	1059 6
Beans, do.	18152 3	38452 3	947 7
Maize or Indian Corn, do.	143875 0	143875 0	13 7
Buckwheat	59 6	50 6	—
Beer or Bigg	—	—	—
Flour from British Possessions.....	cwts. qrs. lbs. 1215 3 21	cwts. qrs. lbs. 1215 3 21	cwts. qrs. lbs. 2 2 6
Flour, foreign	145386 1 24	145386 1 24	9840 2 7

BREAD.

The prices of wheaten Bread in the metropolis are from 6d. to 6½d.; and household do., 4d. to 5½d. per 4lbs. loaf.

SEED MARKET.

FRIDAY, June 28.

Very few buyers were in attendance to day. For all Seeds the demand ruled heavy, at almost nominal quotations. Cakes were somewhat easier to purchase.

The following quantities of Cloverseed paid duty up to the 22nd inst. :—

	1850.	1849.
London	55,210	87,416
Liverpool	7,691	9,722
Hull.....	23,432	33,933
Stock in bond	26,750 cwt.	

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.
 Cow Grass (nominal)..... —s. to —s.
 Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3lbs. each) .. £8 0s. to £9 0s.
 Trefoil (per cwt.) .. 14s. to 18s.
 Rapeseed, new (per last) .. £32 to £36
 Ditto Cake (per ton)..... £4 15s. to £5 10s.
 Mustard (per bushel) white .. 6s. to 8s.; brown, 8s. to 11s.
 Coriander (per cwt.)..... 16s. to 25s.
 Canary (per qr.) new .. 74s. to 84s.
 Tares, Winter, per bush., nominal; Spring, 3s. 0d. to 4s. 0d.
 Caraway (per cwt.)..... 28s. to 29s.; new, 30s. to 32s.
 Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. 24s. to 42s.
 Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton)..... £5 10s. to £7 10s.
 Rape Cake (per ton)..... £4 10s. to £5 0s.
 Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 33s. to 34s.
 Tares, (per qr.)..... small 21s. to 24s., large 25s. to 30s.
 Rye Grass (per qr.) .. —s. to —s.
 Coriander (per cwt) .. —s. to —s.

BOROUGH HOP MARKET.

FRIDAY, June 28.

Favourable accounts having reached us from Kent and Sussex, and the duty having been done as high as £165,000, our market is exceedingly inactive, and last week's prices are with difficulty supported.

	Per cwt.
New Mid and East Kent pockets	122s. to 210s.
New Weald of Kent do.....	120s. — 160s.
New Sussex do.	125s. — 132s.
New Farnhams	240s. — 260s.
Yearling Kents	63s. — 88s.
Yearling Sussex	50s. — 65s.
Old Hops.....	20s. — 60s.

POTATO MARKET.

BOROUGH AND SPITALFIELDS, Friday, June 28.

Nearly 700 tons of foreign Potatoes have arrived hither, since Friday last, in excellent condition. The supply of those home-grown is comparatively small. Scarcely any old Potatoes are now on sale. New ones move off steadily at from 5s. to 16s. per cwt.

HAY MARKETS.

THURSDAY, June 27.

A few loads of new Meadow Hay sold at from £2 5s. to £2 8s. per load. In old Meadow, as well as Clover Hay and Straw, very little was doing.

At per load of 36 trusses.

	Southfield.	Cumberland.	Whitechapel.
Meadow Hay	50s to 72s	48s to 73s	47s to 72s
Clover Hay	55s 80s	57s 84s	55s 88s
Straw	22s 20s	22s 30s	22s 30s

PROVISION MARKETS.

FRIDAY, June 28.

The supply of Dutch Butter having fallen off, the demand for that article is steady, at full prices. Fine Friesland, 66s. to 68s.; fine Holstein, 56s. to 60s., and inferior, 44s. to 50s. per cwt.

Irish Butter moves off slowly, and late rates are barely supported. Carlow, Clonmel, and Kilkenny, landed, firsts, 66s. to 68s.; Limerick, 64s. to 66s.; and Waterford, 62s. to 64s. per cwt. For forward delivery nothing is doing.

In English Butter, the supply of which is large, very little is doing. Fine weekly Dorset, 74s. to 78s.; inferior and stale, 56s. to 60s.; fine Devon, 60s. to 66s. per cwt.; fresh, 6s. to 10s. per dozen lbs.

Irish Bacon moves off briskly at a further advance in the quotations of from 1s. to 2s. per cwt. Prime small Waterford, landed, 58s. to 60s.; heavy, 56s. to 57s. per cwt. Contracts for delivery have been made at 60s. American Bacon is firm. Hamburg qualities have risen 1s. to 2s. per cwt., with a good demand.

ENGLISH BUTTER MARKET.

MONDAY, June 24.

Our trade continues very dull, and none but best quality is saleable. The supply of fresh Butter is abundant, and exceeding the demand.

Dorset, fine weekly 74s. to 78s. per cwt.
Ditto, stale 56s. to 60s.
Devon 60s. to 66s.
Fresh 6s. to 10s. per doz. lbs.

TALLOW MARKET.

FRIDAY, June 28.

We have letters from St. Petersburg, dated the 15th inst. The demand for Tallow ruled heavy, at drooping prices. The transactions had been confined to 1,700 casks, at 109½ roubles. The last quotation was 109 roubles—sellers. A few parcels of Ukraine, for June, had been done at 111 roubles. Our market is in a very inactive state, and prices have given way 3d. per cwt. To-day, P. Y. C. on the spot is selling at 36s. 6d. to 36s. 9d., and for delivery during the last three months, 37s. 9d. per cwt. Town Tallow, 35s. 6d. per cwt. net cash; rough fat, 2s. per 8lbs.

TIMBER.

	£	s.	d.	£	s.	d.
Baltic Timber, per load of 50 cubic feet ..	2	12	6	3	10	0
Yw. Deals, per standard hundred ..	10	10	0	15	10	0
Deck Deals, per 40 feet 8 in.	0	15	0	1	0	0
Pipe Staves, per mille 115	0	0	0	130	0	0
Lathwood, per fm. of 6 feet 8	19	0	0	9	10	0
Petersburgh, Riga, and Archangel ... }	12	0	0	15	0	0
Yw. Deals, per stand. hundred ..	9	0	0	10	0	0
White	12	0	0	14	0	0
Yw. Battens	2	15	0	3	15	0
Riga Logs, for 18 feet cube 100	0	0	0	140	0	0
Stettin Staves, per mille of pipe	2	14	0	2	17	6
Swedish Timber, per load 17	0	0	0	22	0	0
Gothenb. Yw. Deals, per 100 12ft. 3in. 9in.	15	0	0	18	0	0
White ditto 11	0	0	0	14	0	0
Yw. Battens, per hd. 12ft. 2½ in. 7 in.	23	0	0	24	0	0
Christiania Yw. Deals, per hd. 12ft. 3in. 9in.	20	0	0	21	0	0
White ditto 13	0	0	0	16	19	0
Quebec and St. John's Spruce Deals. ... }	12	0	0	16	10	0
per 100, 12 ft. 3 in. 9 in.	8	10	0	10	0	0
1st qual. yw. Pine Deals, per st. hd.	7	10	0	8	0	0
Second do. do.	15	0	0	20	0	0
Third do. do.	3	0	0	3	5	0
Red Pine Deals, per hd. 12ft. 3in. 9in.	3	0	0	3	10	0
Red Pine Timber, per load 2	10	0	0	3	15	0
Yw. ditto 3	10	0	0	4	10	0
Birch ditto 3	0	0	0	3	5	0
Elm ditto 3	15	0	0	4	10	0
Oak ditto 50	0	0	0	70	0	0
Standard Staves per mille standard 12	0	0	0	16	10	0
Puncheon Staves, per mille						

MAHOGANY, &c.

Mahogany, St. Domingo	6½d. to	1s.	9d.	per foot.
Cuba	5½	1	6	
Honduras	4½	1	0	
African	0	0	0	
Cedar Havana	5½	0	6½	
Rosewood. Rio	12½.	20½.	per ton.	
Bahia.....	9½.	14½.		

HIDE AND SKIN MARKETS.

	s.	d.	s.	d.	
Market Hides, 56 to 64lbs.....	0	1½	0	1½	per lb.
Do. 64 72lbs.....	0	1½	0	1½	"
Do. 72 80lbs.....	0	2	0	2½	"
Do. 80 88lbs.....	0	2½	0	2½	"
Do. 88 96lbs.....	0	3	0	3½	"
Do. 96 104lbs.....	0	3½	0	3½	"
Do. 104 112lbs.....	0	4	0	0	"
Calf Skins, light	2	9	3	6	each.
Ditto, full	5	6	6	0	"
Horse Hides	6	6	0	0	"
Lamb Skins	1	6	2	5	"
Shearlings	0	7	0	10	"

OILS.

Linseed, 30s. 6d. per cwt.; Rapeseed, English, refined, 37s.; do. brown, 35s.; Gallipoli, per tun, 42½; Spanish, 41½; Sperm, 85½; do. bagged, 83½; South Sea, 34½; Seal, pale, 31½; Cod, 35½; Cocoa Nut per ton, 38½. to 40½; Palm, 32½.

BARK.

	Per load of 45 cwt.
English, Tree.....	£13 0 0 to £15 0 0
Coppice.....	14 0 0 16 0 0

FLAX.

BELFAST, (Friday last).—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. r cwt.

WOOL MARKETS.

FRIDAY, June 28.

A full average number of buyers has been in attendance at the Colonial wool sales held this week. Very few parcels have, as yet, been withdrawn, and the result of the auctions is expected to be very satisfactory. Arrivals are still taking place from Australia to some extent.

MANURES.

LONDON, JUNE 24.

GUANO.—The demand being somewhat subsided, with more arrivals, the importers are now warehousing.

LINSEED CAKES of all kinds continue in good demand, considering the lateness of the season, and higher prices must be paid, as the stock on hand is considerably reduced.

NITRATE OF SODA nothing doing.

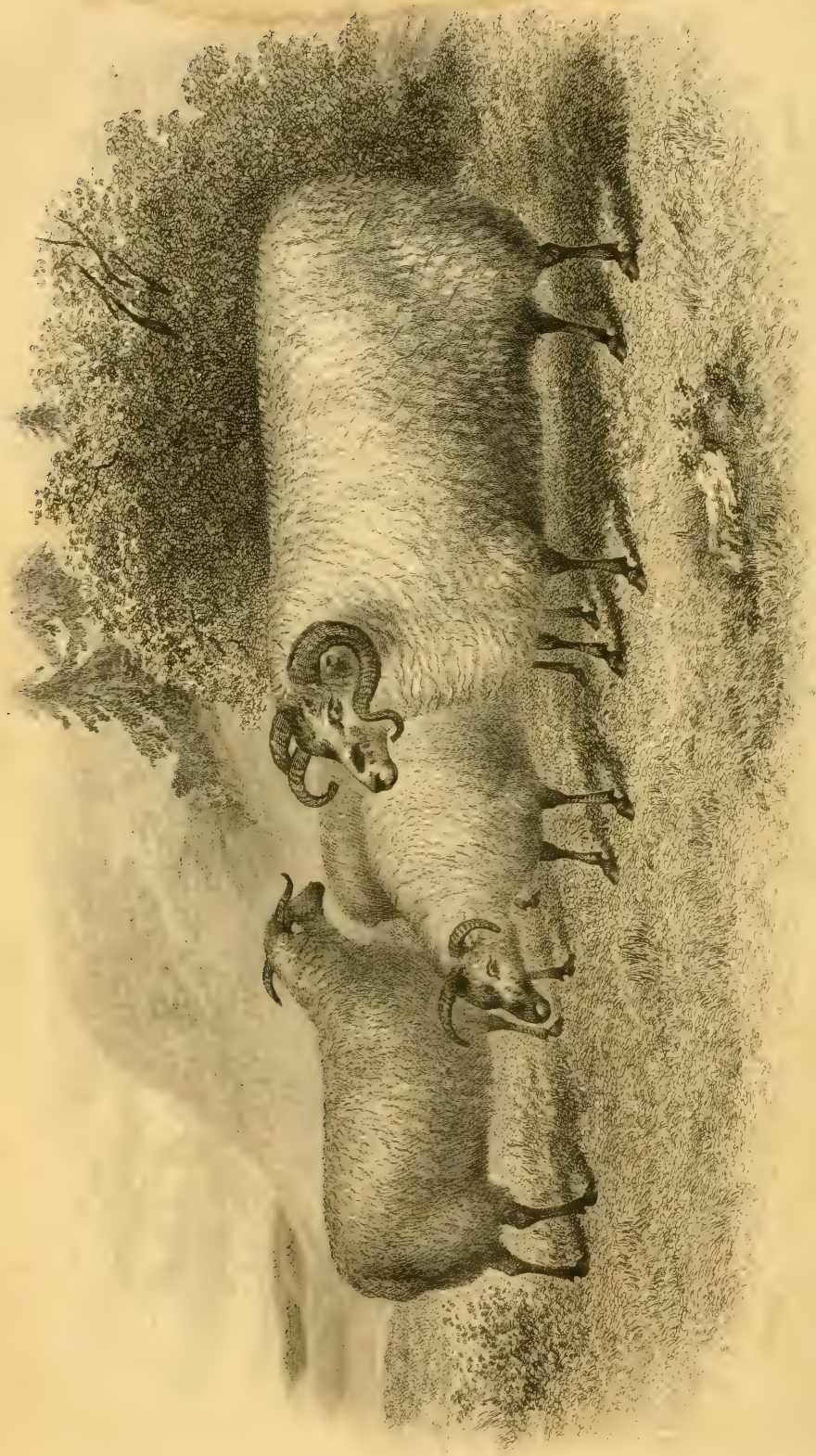
SUPERPHOSPHATE OF LIME.—No alteration since our last.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

Guano, Peruvian	per ton	£0 0 0 to £9 5 0
" In quantities under 5 tons ..	"	0 0 0 to 9 10 0
Potter's Guano	"	0 0 0 to 7 0 0
Nitrate Soda	"	14 5 0 to 14 10 0
Nitrate Potash or Saltpetre	"	26 0 0 to 28 0 0
Superphosphate of Lime	"	0 0 0 to 6 6 0
Soda, Ash or Alkali	"	0 0 0 to 9 0 0
Gypsum	"	1 10 0 to 1 15 0
Coprolite	"	3 0 0 to 3 5 0
Sulphate of Copper, or Roman Vitriol for Wheat steeping....	"	27 0 0 to 29 0 0
Salt	"	0 0 0 to 1 5 0
Bones, ½ inch	per qr.	0 0 0 to 0 15 0
" Dust	"	0 0 0 to 0 17 0
Oil Vitriol, concentrated.....	per lb.	0 0 0 to 0 0 1
" Brown	"	0 0 0 to 0 0 ½
Rape Cakes.....	per ton	4 0 0 to 4 5 0
Linseed Cakes—		
Thin American in barrels or bags ..	"	7 0 0 to 7 10 0
Thick ditto round.....	"	6 5 0 to 6 10 0
Marseilles	"	6 10 0 to 6 15 0
English	"	6 5 0 to 6 10 0

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THE FARMER'S MAGAZINE.

AUGUST, 1850.

No. 2.—VOL. XXII.]

[SECOND SERIES.

PLATE I.

A SHORT-HORNED HEIFER.

The subject of our first plate, "The Lady of Brawith," a yearling heifer (roan), was calved June 20th, 1848. Was got by Emperor, dam Moss Rose 2nd, by Sir Walter (2639), g. d. Moss Rose, by Belvedere 2nd (3127), gr. g. d. by Waterloo (2816), gr. gr. g. d. by Barmpton (54), gr. gr. g. d. by Kitt (2179), gr. gr. gr. g. d. by Kitt (2179), gr. gr. gr. g. d. by Mr. Page's Bull (6269), gr. gr. gr. gr. g. d. by Mr. Middleton's Bull (438).

"The Lady of Brawith" obtained first prizes at the country meetings of the Royal Agricultural Society at Norwich in 1849, and at Exeter this year, and at local meetings in Leeds and Gateshead. The gold challenge cup, value 100 guineas, and silver medal of the Royal Agricultural Improvement Society of Ireland was awarded to her last year, and again this year at Cork, where she also obtained the first prize of 10 sovereigns as the best heifer in calf or milk, and the gold medal as being the best all prize cows and heifers exhibited at the show.

PLATE II.

RAM AND EWES OF THE BLACK-FACED HEATH BREED.

The ram and ewes which form the subject of our second plate obtained the first prize, in their respective classes, at the Highland and Agricultural Society's Show at Edinburgh, in 1848. The ram obtained first prizes at two different local shows, since held, in the district of Campsee; the ewes were never afterwards shewn.

The black-faced heath breed is chiefly found in the more northerly division of the chain of mountains which extend from the high lands of Derbyshire on the south to the confines of Scotland on the north, and the elevation of which tract is from 1200 to 3000 feet; the highest summits being Cross Fell, near the sources of the South Tyne and Tees on the eastern part of Cumberland, Skinner Fell on the confines of Yorkshire and Westmoreland, and Wharfedale and others in the westerly part of Yorkshire.

Professor Low in his work on the Domestic Animals of the British Islands, says: "This breed possesses characters which distinguish it from every other breed in the British Isles. It is of the smaller races of sheep, with respect to the weight at which it arrives; but is larger and more robust than the Zetland, the Welsh, and the ancient soft-woolled-sheep, which it displaced. It somewhat resembles the Wallachian; and, as the latter has an affinity with the Persian, it might be conjectured that it is derived from the east. But it is more natural to assume that its peculiar characters have been communicated to it by the effects of food and climate, in the rough heathy districts from which it is derived. The male and female have horns; very large and spirally twisted in the male, but sometimes disappearing in the female. The limbs are lengthy and muscular, and the general form is robust, but the shoulders are not so low as in the Welsh breeds, nor are the posterior limbs so long. The face and legs are black, and there is a tendency to this colour in the fleece, but there is no tendency to the brown or russet colour which distinguishes the older fine-woolled races. The fur is shaggy, and the wool coarse, in which respect it differs from that of all the other mountain breeds of the country. It is of medium length, and weighs about three pounds the fleece, when washed." The ordinary weight of the wethers, when killed at the age of about four years, is fifteen pounds the quarter, but some are made to exceed this weight, when properly treated and sufficiently fed from an early age. The mutton is not so delicate as that of the Welsh sheep, or the Southdowns; but it is more juicy, has more of the venison flavour, and is preferred to every other by those who are used to it. The mothers are hardy nurses, and

are able to bring up their young, when they themselves have been exposed to severe privations. In snowy weather, this wild and hardy breed will dig up the snowy surface to reach the herbs beneath, and support life under circumstances in which the more delicate races would perish. They do not, like the sheep of Wales, prefer the summits of the mountains, but feed wherever pasturage can be obtained, and are not so nice in the choice of herbage as the Southdowns, Merinos, and other races, derived from countries yielding the finer grasses; and, although wild and independent in their habits, they are not so restless as the mountain sheep of Wales and other parts, but can be induced to remain in enclosures, when sufficient food is supplied to them.

THE BRITISH FARMER.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The past month has been marked as the period when England's farmers have held their great annual gathering at the valuable country show of the Royal Agricultural Society of England. That show has again borne witness to the skill, the labour, and the indefatigable perseverance, in times too of extreme depression, it must be remembered, of the cultivators of our varied soils—labours which have never slackened, never ceased during all the ebbs and flows of agricultural prosperity. The show to which I allude proved some of these statements. There was no falling off there, either in the number, the breed, or the quality of the stock exhibited, or in the skill displayed in the implements produced. Their owners had evidently continued their efforts amid all discouragements. Adverse seasons, steadily falling markets, had not restrained their steady efforts to improve the live and dead stock of the farm. They seemed to have taken a more hopeful course, and to have, perhaps correctly enough, concluded that such a state of commercial affairs as we are now enduring (if we are to be guided by the experience of all bygone ages) cannot but soon pass away, and that in their place, in some way or other, will arise that steady return of prosperity which must ever attend the cultivators of the soil of every nation not hastening to destruction. The history of the English farmers affords us no exception to this rule even in its most primitive days. The time was, we know, when England's farmers were in the state of those of all half-civilized countries; and all other classes were in a similar condition. Commerce was only carried on by pedlars or at country fairs. The merchant was a much rarer and very different character than now: the country shopkeeper was then nearly unknown. As I have had occasion to remark in another place, those who wish for the return of the state of English cultivation which attended the middle ages must be content to expect only the ill-productive arable soils of those days, and their peasant-farmers, too. All high cultivation must be abandoned, all improvement of breeding retarded or ended, the least expensive tillage only adopted: the

crops produced must be left as much as possible to nature—every possible outlay of labour or capital avoided. Such, in fact, was the state of the tillers of England's soils three centuries since.

Bishop Latimer flourished in the first half of the sixteenth century; and his father was among the most respectable yeomen of his time, yet his farm evidently did not exceed 100 acres. "My father," says Latimer, "was a yeoman, and had no lands of his own; he had only a farm of three or four pounds by the year, at the utmost; and hereupon he tilled as much as kept half a dozen men. He had a walk for 100 sheep; and my mother milked thirty kine," &c. (*Latimer's Sermons*, p. 30.) But that this class of society was then not very refined, is proved by Sir A. Fitzherbert, in his *Book of Husbandry*, declaring, "It is the wife's occupation to winnow all manner of corn, to make malt, to wash and wring, to make hay, to shear corn, and in time of need to help her husband to fill the muck-wain or dung-cart; to drive the plough, to load corn, hay and such other; and to go or ride to the market, to sell butter, cheese, milk, eggs, chickens, capons, hens, pigs, geese, and all manner of corn."

To these bygone primitive days of wretchedness, all classes of our islands have for ever, I trust, bid adieu. Society has left those days far behind, and the English farmer is certainly not an exception to the still-advancing comfort and knowledge of our country. His profession, it is true, like that of all others, has its period of prosperity and temporary depression; but the good sense of the legislators of almost all nations has ever held as an axiom of the most unerring kind, this great truth, that amid the apparently conflicting interests of all ranks and classes, the first in importance, the first in real value to any state, are the cultivators of its soil.

It is also true that a certain proportion of small holders is desirable in all agricultural districts; and it is still more desirable that a higher and better degree of instruction should be introduced amongst not only them, but amid the labourers of agriculture from whom these little landholders commonly spring. Such a class of cultivators can often very

profitably farm the soil near to large towns, or in localities where the plough cannot be so successfully introduced, or only in conjunction with the fork or spade.

At the last meeting of the Farnley Tyas Association (near Huddersfield), Mr. John Gill, a spade farmer, of that place thus briefly and usefully described the rotation of his crops on his eight-acre farm, cultivated on the four-course shift, as follows:—Two acres in green crops, mangle wurtzel, turnips, potatoes, and cabbages; two acres in red clover; four acres in corn; half an acre of tares following the last grain crop, as an extra one, followed the same year by turnips. By manuring the two acres under root crops, the whole farm becomes manured in four years. By stall feeding the farm is made to support itself with manure, with the exception of lime and gypsum. In one year, from November 1848, to November 1849, manure has been manufactured that will supply one-third of the farm, exclusive of the liquid manure prepared for the clover; and this manure remains partly in store for the second crop. The red clover is sown with the first grain crop, and by sowing it over with gypsum, and by sprinkling the sward when cut, with tank liquid it can be cut three times; and it is found that a good crop of clover so managed will stall-feed the most cattle on the least space of ground. The produce even on poor soils like these is always comparatively large. They are often better tilled and more carefully weeded than is well attainable on larger extents of land. This was shown in some degree by the amount of produce, rewarded not long since at the meeting of the Royal Agricultural Society of Guernsey—an island where the farms are almost all very small holdings. The following was the produce of root crops:—

Mr. James Mahy—Potatoes at the rate of $10\frac{1}{2}$ tons the acre.
 Mr. Thomas Carre—Parsnips at the rate of $20\frac{1}{2}$ tons the acre.
 Mr. N. Naftel—Swedes at the rate of $29\frac{1}{4}$ tons the acre.
 Mr. H. Quertier—Turnips, after vetches (long white), at the rate of 31 tons the acre.
 Mr. N. Mellish—Mangold wurtzel (yellow globe), 49 tons the acre.
 Mr. J. T. Blondel—Carrots at the rate of $31\frac{1}{4}$ tons the acre.

In the training of children so as to enable them in after-life to become the efficient holders of such little farms, the value of those schools, in which the boys are occasionally employed in agriculture, is very considerable. At the same meeting at which Mr. Gill described his farm, the master of the Farnley Tyas School thus detailed the results of the first year's cultivation of the poor land (we believe only an acre), attached to the school.

"In most of the operations of the garden the abler children have been called into use, and it gives me the greatest pleasure to report that at all times the greatest willingness has been shown. No compulsion has been used; but whenever they have been wanted I have always found them most willing; and I have to remark that those boys who are diligent in this little work are the more so in their lessons in the school; and I feel convinced of late that with a little arrangement of their lessons on any day when it is requisite to take them out, no loss will be sustained by the boys in the routine of the school business. An account has been kept of their labour, and I am in great hopes that what has been learned and practised in that little plot of ground will be of use to them in after life; that the same taste will go with them into manhood, and that they will embrace the facilities now offered for the possession of garden plots; and they will cultivate such pieces of land with the same pleasure as they do now. I have endeavoured as much as possible not to interfere with school hours; and I am prepared to state that the greater part of their labour has been performed between half-past twelve and two o'clock. In the matter of field gardens or allotments of land to the industrious, too much praise cannot be given, as the advantages of the possession of a small portion of land to one with a family are many. For myself, I can speak as having derived great pleasure at all times from the cultivation of the school allotment, it having given myself and family many hours of pleasant recreation both before and after the school hours. One half-acre has again been prepared and sown with wheat. Yard manure and night soil have been used. Below is a statement of the produce and expenditure:—

DR.	SCHOOL FARM.	£	s.	d.
Oats and barley seed		0	11	0
One pack of potatoes		0	14	0
Two loads of lime		1	5	0
$1\frac{1}{4}$ cwt. of guano		0	12	6
Other seeds		0	6	0
Hired labour (boys)		2	17	0
My own labour		2	10	0
Rent		1	10	0

£10 5 6

CR.	PER CONTRA	£	s.	d.
18 bushels of oats at 18s. per qr.		2	0	0
5 bushels of barley at 3s. 4d. per bushel ..		1	10	0
10 pecks potatoes at 8s.		4	0	0
12 pecks peas at 6d.		0	6	0
Oat and barley straw		2	0	0
Mangold wurtzel, turnips, and beans ..		1	0	0
Cabbages		0	2	6

10 18 6

These are the young cultivators who, in after life, will in need till the plots of land to which I have before

alluded. In their proper place they will prove an invaluable class of the community. But my readers must not misunderstand me, or suppose that I am advocating the introduction of these to the exclusion of the larger farmers. We all know full well

that they will be useful in their proper place; but I trust and feel well assured that these will never supplant the present race of English farmers, who we must ever regard as the most valuable body of agriculturists that ever tilled the soils of any country.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. IV.

Complaints continually occur of the quality of butter. One appeared in the *Agricultural Gazette* of the 30th of June, on the sudden but continuous deterioration of quality in a private dairy, where, till lately, butter of fine flavour had always been obtained. It is impossible to meet the complaints made in print; and we can only agree with the editor's remarks, and observe, that, in all probability, want of thorough cleanliness might have left some decomposing matters either in the milk-vessels or in the churn. *Bad herbs*, as *wild garlic* for instance, appearing among the meadow grass, will assuredly taint the milk of any cow; therefore, care and caution from beginning to end in every part of dairy operations must be exercised, if a family hope to attain a perfect butter; and even then, atmospheric electrical agencies may interfere.

As to salted *Irish* butters, the complaints are justly numerous; and therefore I feel it necessary to introduce the following passage on the Swiss method of preserving butter for winter use, which is found in that amusing and instructive work by Dr. Forbes, entitled *The Physician's Holiday*. It has been alluded to in several periodicals; yet, although somewhat objectionable on account of the change in quality which the process must produce, is worthy of serious attention. The learned physician shall, however, speak for himself, and my quotation is literal.

Formula.—Into a clean copper pan, (better, no doubt, if tinned) put any quantity of butter, say from 20 to 40lbs., and place it over a *very gentle* fire, so that the butter may melt slowly; and let the heat be so graduated that the melted mass shall not come to the boil *in less than two hours*. During all this time the butter must be frequently stirred, say once in five or ten minutes, so that the mass may be thoroughly intermixed, and the top and bottom change places from time to time. When the melted mass boils, the fire must be so regulated as to *keep the butter at a gentle boil* for about two hours more, the stirring being still continued, but not of necessity so frequently as before. The

vessel is then to be removed from the fire and set to cool and settle, still gradually; the process of cooling being supposed to require about two hours more. The melted mass is then, while still quite tepid, to be carefully poured into the crock or jar in which it is to be kept. In the process of cooling there is deposited a white, *cheesy* sediment, (proportioned to the quantity of butter,) which is to be carefully prevented from intermixing with the preserved butter. As might be expected, there are some variations in the practice of different individuals. One very experienced man assured me that a much shorter time than two hours need elapse between the setting of the vessel on the fire and the bringing the butter to the boiling point. Another said that the time should bear some relation to the quantity of the material used; an average of ten minutes being allowed for every pound. The same party also told me that the appearance of the *grounds* rising up to the top when the mass is stirred, is itself a proof that the coction is sufficient. My guide at Chamouni told me that his wife usually added a small portion of salt to the mass, in the early stage of boiling.

"Everybody agreed in asserting that butter so preserved will last *for years* perfectly good, without any particular precautions being taken to keep it from the air, or without the slightest addition of salt. Indeed, I, myself, tasted more than once butter so prepared fully twelve months after preparation, and found it without the slightest taint. It wanted the flavour of fresh butter, but seemed to me infinitely more palatable than our coarse butter. This boiled butter, however, is not commonly used, even in Switzerland, as a condiment with bread, as fresh butter is, but merely as an article in cooking, for which purpose it is said to be even better than butter newly made. I saw at the Hotel d'Angleterre, in Chamouni, the very jar out of which all the butter used in the kitchen was taken, and certainly it would not be easy to find more delicate cookery than we there met with."

I have preferred to copy this entire passage for the double object of proving, first, that by a similar

process of *clarification*, (as in the corresponding case of *honey*), any person who possesses a properly tinned saucepan can furnish himself with butter which will keep for months. The operation must be conducted slowly and attentively—with perfectly good fresh butter—in autumn, when the weather is cool; and by it the *casein* is deposited, while the water of the whey that had been retained is carried off by slow evaporation. True, it is, that butter so clarified undergoes some chemical alteration in flavour and texture; but at the same time it is divested of those constituents which inevitably produce rancidity; a condition that salt, however applied, even if it be perfectly pure, cannot wholly obviate. Second, by retaining the whole passage, the facts adduced obtain the sanction of good authority; for no doubt or suspicion can attach to statements made by an eminent physician, who thus testified what he had seen and experienced.

Fresh butter must in all cases and seasons be used within a week or ten days; and where a family can so provide it, nothing more will be required. The question then at issue is *this*:—By what means can the public be supplied with a pure winter butter, undecomposed and free from the putrescence of rancidity?

I have insisted upon the superiority of meadow-grass over every other kind of food, and therefore urge the necessity of good *hay-making*. It would now be out of time and place to dwell upon that operation, especially as it was amply described in

this magazine of June, 1849, to which the reader is referred; but if meadow is to be turned to the best advantage, care must be taken to extirpate docks, vile and flavourous weeds, and wandering elm-sucker; rushes, if present, prove the existence of a watery subsoil, which can be removed by drainage only. During the spring months the cow or cows should always be supplied with green grass, cut daily and taken to the yard, where there ought to be a shed and stall. When the remaining grass becomes fit for the scythe it should be mown, always taking advantage of that period in June, wherein the wind blows from some quarter *east north*, which rarely fails, even in the wettest seasons. A lightish crop *well secured* is always to be preferred to one left to become heavy, and subsequently spoiled by July rains. We insist upon “stall-feeding,” (always including a spacious straw-yard for *air* and that degree of exercise which the animal's health must require), because experience has proved that the volume of milk is daily lost by wandering abroad, even for a few hours in a home meadow.

If the domestic property do not comprise meadow sufficient to supply spring grass and dry hay for the winter, recourse should be had to hired clover, and lucerne grown at home. Of this crop, and the various appliances which must be resorted to in order to fulfil the required conditions to obtain milk, cream, and fresh butter free from foreign taint, something remains to be said hereafter.

ON THE MECHANICAL EFFECTS OF MIXING SOILS.

The changes which are daily going on in soils are amongst the most extraordinary circumstances with which the agriculturist has to deal. At one period the entire struggle amongst farmers is for the “good wheat and bean land,” and at another time for “light dry gravel:” nay, the land which when first taken out of grass would grow turnips and potatoes with facility, soon becomes so adhesive, and of a texture so tenacious and unyielding, that scarcely any amount of fallowing or any process of disintegration which can be given to it by the cultivator, will render it fit for the growth of these crops. Now, if cultivation of one kind will make one soil tenacious and adhesive, may not some other kind make the opposite the same, and render our sands capable of growing wheat? On this subject a gentleman, once a farmer, writes—

“The present low price of wheat has a tendency to reduce the prices of spring corn, oats, and barley; it operates also in making the farmers turn their attention almost exclusively to the growth of

wheat, which holds out a better prospect of remuneration for their capital, skill, and industry, and of which the farmers as a body possess no small share in the aggregate, whatever may be said to the contrary. The lands which before were almost exclusively devoted to the growth of turnips, barley, and oats, with an intervening crop of clover, are now, from the low prices of way-corn, of necessity sown with wheat, which, in many instances, proves a failure. Nevertheless the farmer is obliged, from sheer necessity, to proceed, and try again and again, until at length he overcomes the difficulties which he has to encounter in following out his new plans, and is rewarded for his perseverance by a bountiful crop. Wheat thrives best on heavy soils, and is very uncertain on those of a loose sandy nature.

“The mode of cultivating light soils has been, winter fallow, crop of turnips, which has been partly pulled partly eaten on with sheep—barley, seeds, and oats, then fallow again, thus never attempting the growth of wheat, because the soil was

considered unfitted for it. In order to procure a remunerating crop of wheat on light soils, it is necessary to pursue some method of making the land as tenacious as possible; for although the wheat may look remarkably well during the winter season and the beginning of spring, yet it has a great tendency during the time it is tillering, in the latter end of the month of March, to turn out of the ground; hence the necessity of keeping the soil in as solid and compact a state as possible. The fallow should be well marled or covered with compost, of which clay should form the greater part; then, by means of repeated ploughing and harrowing, thoroughly incorporate and mix the whole; then manure for the crop of turnips—150 to 200 tons of marl is not too heavy a dressing. The turnips would be best sown on the level (provided the land is not too subject to run to weed, so as to need horse hoeing) by means of one of the improved Northumberland drills. By sowing on the level on such lands, the moisture so necessary to the young plant is much better retained in the land than by ridging. Let every means be used to check evaporation, and give additional solidity to the soil, for it is by the particular treatment of the land for the foregoing crops that it is to be brought into a fit state for the growth of wheat. The turnips should be eaten on with sheep, as, by their repeated trampling backwards and forwards between their food and their resting place, the land gets kneaded with their feet to the consistency of dough. A little oilcake given them would also tend to make the turnips last longer, and also serve to make the land more tenacious, and the soil would be benefited to a greater extent by the dung and urine of the sheep when fed by this description of food. The time most proper to eat-off the turnips is in the beginning of winter, as the soil is generally the wettest at that season of the year, and likewise the turnips have stopped growing, which they would again resume if left until further on in the season, and so drawing nourishment from and impoverishing the land, and also striking their roots deeper into the soil, and thus rendering it more porous, and defeating the object we would attain.

"In order to give additional solidity to the soil, it should be left unploughed through the winter until the first week in March, or about a week or ten days before it has to be sown; it will become firmer by the rain and snow which may fall beating and lying upon it, and the frost will not have the power of rendering it so porous as if in a ploughed state.

"Barley is the best kind of spring corn to sow, in order to secure a full crop of seeds, which are necessary for a good crop of wheat, as it does not

grow so tall and rough as oats, and by that means prevent the clover from vegetating as it ought. The clod-crusher should be freely used upon the soil when available, in order to render it as solid and compact as possible. The young seeds should be eaten-off pretty near, after the barley is secured, in order that the soil may be as much exposed to the rains and snow of winter as possible; but during the ensuing summer it is best not to eat them so near, but give them full scope for the growth of their roots, which grow in proportion to the size of the top of the plants, and penetrate the soil and secure the particles of which it is composed firmly together, acting in a manner precisely opposite to the effect ascribed to the roots of turnips.

"The clover ley should be ploughed up for wheat about the first or second week in October, and the ploughs followed by a heavy land presser, which will make a firm bed for the seed, and also preclude the possibility of turning out in the spring or losing moisture.

"If the new-sown land were also trodden well with sheep, it would, no doubt, be a great benefit. The clod-crusher should be freely used in the spring, whilst the land is rather damp, and every means adopted to seal the pores of the soil and check evaporation; for the tighter the surface can be made, the greater the chances of a good crop.

"The best kind to sow is the Spalding's prolific, which is proved by experience to thrive and yield the best on a loose sandy soil. A farmer, who occupies a large quantity of this kind of soil, states that he finds it to answer remarkably well, for by sowing Spalding's and judicious treatment of his land, he has been enabled to realize a crop of fifty bushels per acre, and that on land which fifteen years since was not worth ten shillings per acre.

"R. H. B."

The mechanical effects of mixing soils are amongst the most extraordinary means the farmer possesses of adapting soils, naturally unfavourable, to the growth of any particular species of plant. Yet, to spread two hundred tons of sand, for instance, over a clay field might do little good, but the same quantity on a deep peat bog is very valuable; whereas, to spread as many tons of clay of the very poorest kind on an acre of sand or peat, will so alter its texture as to enable it to produce a range of crops to which it was before an utter stranger. But if a marl, or a marl compost, as "R. H. B." suggests, be adopted, you have, in all probability, not only a mere mechanical, but also a chemical application; for there are few of the marls which do not contain more or less of organic remains, and consequently phosphoric acid. Nor can sheep-treading be too highly estimated; and if, as "R. H. B." suggests, a small quantity of oil-

cake be added to the ordinary food of the sheep, either on the seeds or on the turnips, a far greater amount of consolidation will be effected. More sheep will be fed on the same area of land, there will be more dung, and more treading; besides, the residuum of linseed or rape-cake has in itself an effect so binding, that it alone will, in some degree, promote the proper consolidation of the soil.

We witnessed a very remarkable instance of the power possessed by marl, of making a field, literally a sand-bed, and totally unproductive, capable of growing sound and healthy crops of wheat. The soil was a white, sharp sand, full of springs, and covered over with a thin stratum of peat, the result of decomposed heather and moss.

The poor tenants had dug up the peat for fuel, and what remained, in many instances, amounted to a sand-bed, as complete as if a sandstone had been pounded to powder. In this state the farm was entered upon by Mr. William Linton, of Sheriff Hutton. He deep-drained the sand to tap the springs; and in performing this operation discovered a bed of unctuous marl at some six feet

from the surface. This he took up and spread over the sand, sowed turnips and wheat upon the land, and we can bear witness from personal inspection that a very complete wheat-producing soil was the result. The quantity of marl was from 150 to 200 cart-loads per acre; and not only was it successful in the production of wheat, but the quick-wood fences planted on this same sand were also marled, and the effect was most wonderful; the recent fences soon overtopped some others which had been planted in the sand many years ago.

We will not now stop to inquire why some plants require more tenacious soils, and others the more porous and friable. May it not be—nay, is it not—the impatience of the presence of a large quantity of oxygen which injures the roots? For it is evident that the mere tendency to retain moisture will not of itself account for the difference.

We hope in an early number to glance at the chemical peculiarities of wheat soils, as we have now alluded to the mechanical.—Gardeners' and Farmers' Journal.

OUR AGRICULTURAL LABOURERS—ENGLISH, IRISH, AND SCOTCH.

BY MR. W. BURNES, LONDON.

Nations may talk of the greatness of their manufactures and the success of their commercial enterprise; but boasting of great things in these times is no evidence of realities. The history of the world in all ages pronounces but one undeviating decree on the subject—that the prosperity of every nation is proportional to the industry of its agricultural labourers; hence the marked attention which the greatest of statesmen have bestowed upon them. It is true that manufactures and commerce have given rise to more discussion in the senate—so does the sickly child and the prodigal in the parlour; but, doubtless, if the latter cannot be advanced in favour of the one, neither can the former in favour of the other.

No nation, perhaps, has more right to boast of its manufacturing and commercial industry, generally speaking, than Britain; and nowhere do we find such striking anomalies as among her agricultural labourers! Science, certainly, has been more successful in reducing the labours of the former to something like equality, than those of the latter. The simple craft of more simple times has fled before the mechanical ingenuity of Glasgow, Manchester, and Birmingham. But in agriculture, the ingenuity of the husbandman has not yet succeeded in banishing such implements as the caschrom, &c.,

Britain, however, exhibits more interesting anomalies among her agricultural labourers than those just referred to, relative to their implements. A compound of various tribes, the sworn enemies of each other, it is not to be wondered at that nationalities the most diversified should at one period have existed, connected with the management and domestic economy of this class of the inhabitants of the British isles. But how these have been transmitted to posterity so complete and unchanged in character, and how Englishmen, Scotchmen, and Irishmen pertinaciously cling to them, in many instances with a warmth of zeal more like religious fanaticism than the spirit of intelligent workmen, is a question not so easily reconciled with the progress of science, and the march of modern improvement already referred to in the other branches of industry. In every art it is but natural to look for something like uniformity in the qualifications and circumstances of its artisans. However diversified their talents may be when individually examined, yet, collectively, a common level characterizes the whole; and in every case, generally speaking, there is no better index to the perfection which any art has attained than this very level itself. But when we examine the qualifications and circumstances of the agricultural labourers of England, Scotland, and Ireland, we are driven to the conclusion that

as yet a common level has not been attained or approximated to. A cursory review of their numbers, employments, incomes, amount of labour performed, and the produce of their labours, brings before us results the most conflicting imaginable—results which call loudly for progress.

1°. *Number of Labourers.*—In England, according to the census of 1841, there were, above the age of twenty, 724,625 men; Wales, 47,477—total, 772,102 of this age. Under this age in the former, 139,661; in the latter, 17,155—total young men and boys, 156,816. Of females engaged in agriculture, above the age of twenty, 26,888 in England, and 1,300 in Wales—total, 28,188. Under this age, 8,460 in the former, and 735 in the latter—total, 9,195 :—grand total, 37,383. Of agricultural labourers male and female, according to this account, we would have, for England, 899,634, and Wales, 66,637—total, 966,271. If we add to this sum the number of small farmers who cultivate their own farms, and also take into account the assistance received from Ireland and the manufacturing classes during harvest, both of which is necessary in any comparative view, we cannot estimate the total number of labourers employed annually in English agriculture at less than 1,000,000 effective hands.

In Scotland there were estimated to be at the same period, 109,550 men, and 39,854 young men and boys—total males, 149,404. Of females there were, above the age of twenty, 13,528, and under that age, 5,114—total, 18,642 :—grand total, men and women, 168,046; and giving credit for assistance, as in the case of England, the number of effective hands annually engaged in Scottish agriculture may be set down at 170,000.

In Ireland we shall have more difficulty in coming to satisfactory conclusions. "It is estimated that about 5,358,000 persons are directly dependent upon the cultivation of the soil." If we take five as the number of members in each family, it will give us 1,070,000 heads of families. Of this number, 300,000 occupy under five acres of land each, 250,000 under fifteen acres, and 70,000 thirty acres and upwards; so that we may set down the number of farmers who only rank as labourers at 600,000, and householders or heads of families, only 400,000—total labourers whom we may consider above the age of twenty, 1,000,000. This number, being heads of families, would embrace a population of 5,000,000 equally divided or nearly so as to sex. If we estimate the number of boys and girls under the age supposed fit for labour at 2,000,000, it will leave us a remainder of 1,000,000 more labourers, 500,000 young men and boys, and an equal number of young women and girls; so that Irish agricultural labourers

stand thus :—Indoors, 1,000,000 mothers and 2,000,000 children; out-doors, 1,000,000 fathers and 1,000,000 sons and daughters—total, 2,000,000 engaged in agriculture.

Such being the number of labourers in each of the three kingdoms, exclusive of 4,246 for the isles of the British seas, and 45,727 gardeners for England, 1,218 for Wales, 6,418 for Scotland, and 287 for the isles, the following will present a tabular view of the whole :—

England and Wales	1,000,000
Scotland	170,000
Ireland	2,000,000
Isles of the British seas.....	4,246
Total agricultural labourers..	3,174,246
Gardeners	53,650

3,227,896*

2°. *Employments.*—If we take one ploughman for every fifty acres, which is about the rate calculated in Huntingdonshire with one plough, and assume the rest of the labourers for all England to stand in the same ratio to ploughmen as the labourers did to the ploughmen with which we stood connected in the same county, then we may deduce the following analyses :—

Ploughmen in regular employment	263,000
Cattlemen and shepherds, exclusive of boys.....	87,666
Total generally employed on day's wages.....	350,666
Taskmen regularly employed ..	131,500
Young men and boys under 20 years of age.....	100,000
Total of this class	231,500
Taskmen not regularly employed	289,906
Young men and boys	56,816
Total of this class	346,722
Females	37,383
Small farmers and reapers in har-	
Grand total as before.....	1,000,000
vest	33,729

* The above is principally quoted from M'Culloch's *British Empire*; and in this note we may append the number of farmers and graziers :—

England and Wales.....	258,232
Scotland	54,866
Ireland	685,309
Isles of the British seas	3,960

Total, 1,002,367

Comparing the one table with the other, there appears to be in England four labourers for every farmer; in Scotland about three and a half; and in Ireland the number of farmers exceeds that of the labourers, not reckoning their own families such.

We may take the same ratio for Scotland as we have done above for England as to ploughmen, thus:—

Ploughmen.....	67,800
Cattlemen and shepherds.....	20,000
Common labourers.....	21,750
Young men and boys.....	39,854
Females.....	18,642
Small farmers and reapers.....	1,954

Total as before..... 170,000

In Ireland, where system and order form the exception, the subdivision of labour into employments is not to be looked for. He who carts out the manure must also spread it, and afterwards plough it into the soil; and he who sows the seed must also harrow in the same, let consequences follow as they may. The grand problem in the sister country is, to get the 2,000,000 hands started upon the field. Her arable acres are generally cultivated either with the plough, spade, or loy, generally seeded, and her crops are invariably harvested. Her cattle are also cared for. All this is done by her own 2,000,000 labourers, without any assistance from England, and the following may convey some notion how it is accomplished.

Two small farmers, for instance, each holding some ten acres, will each keep a horse. These join and form a plough, which is sometimes the property of one, but as often the joint property of both, although one generally pretends to own it. In a few cases, one of the two may manage the team when in yoke; but in the generality of cases both are required—the one to hold the plough, and the other

to drive the horses. If they are active, as Irishmen count activity, they may cultivate some thirty to thirty-five acres. There are perhaps 80,000 small farmers, who have a horse each, and join in this manner, making 40,000 ploughs. If we say 35 acres to one plough, then these will cultivate 1,400,000 acres. There are, again, perhaps 20,000 farmers, holding from 15 to 20 acres each, who keep a pair of horses and plough. Many of this class are above the rank of jobbing farmers, and only assist their own relatives. We cannot, therefore, in this case, set down more than 25 acres to each ploughman; so that the whole would only cultivate 500,000 acres. A holding of from 25 to 30 acres is considered a "*brave farm*;" and, with few exceptions, gives full employment to a ploughman and pair of horses. Of this size there may probably be 40,000 farmers, each having a hired ploughman, ploughing on an average 30 acres—total, for this class, 1,200,000. There may probably be cultivated with the spade and loy 500,000 acres more, leaving a remainder of 2,150,000 acres to be cultivated by landlords and gentlemen farmers at the rate of 40 acres to a plough. We know of many of this class who equal this country, and plough 50 acres with each team; but a great many who only farm from 40 to 80 acres, keep two ploughmen—a circumstance which will bring down the average to what we have stated, making the total number of ploughmen in the employment of this class, 53,750. The number of ploughmen and ploughs employed in the cultivation of Ireland may be thus tabularly stated:—

	Ploughs.	Acres.
80,000 small farmers conjunctly.....	40,000 at 35 acres,.....	1,400,000
20,000 .. singly.....	20,000 at 25 do.	500,000
40,000 hired ploughmen.....	40,000 at 30 do.	1,200,000
53,750	53,750 at 40 do.	2,150,000
250,000 labourers with the spade and loy.....		500,000
443,750	153,750	5,750,000

We have thus succeeded in starting nearly a fourth part of the Irish labourers on the field; but the most difficult part of the problem remains to be solved—the getting of a job for the remaining million and a-half. The management of live stock upon small farms is always an expensive concern, and the number of small holdings in the sister country, consequently increases the number of persons engaged in this employment. The amount of labour expended in this department, including the dairy and the management of pigs and poultry as well as oxen and sheep, probably comprehends the labours of the one-fourth of the labourers engaged in Irish agriculture; so that we may appropriate 500,000 of them to this job, the one-half of whom will be women. This would still leave a

balance of 900,000 besides the 250,000 engaged probably one-half of the season upon their own holdings with the spade and loy. Probably 150,000 of these again may be for the most employed at the species of jobs falling to the lot of the common labourer by landlords and gentlemen farmers; but regular employment for any of this class, generally speaking, where so many are idle, forms the exception. "Fair play," the continual, or we may say the national, watchword in the sister country, demands a share for each, and this is generally given if possible. Hence the intermittent character of the operations of the field which so conspicuously present themselves to a stranger, but which are unobserved by the parties, either master or servant. Twenty labourers may be seen

collected into a field to perform a job which one Scotchman or Englishman would have to do in a week. If they finish it the master is content: fewer hands would not have done so, and hence would have encroached upon to-morrow; and with this opinion the labourers are fully satisfied. "The job was never done so well in one day with a less num-

ber. It is not fewer hands which Ireland wants, but an additional job, at present unhappily 'lost for the want of seeking,' to fill up the odd days of the calendar!"

From these approximations, the agricultural labourers of Ireland may be thus stated in round numbers:—

Ploughmen, or those generally engaged at horse-work.....	450,000
Attending live stock and the dairy	500,000
Employed for the most part on their own holdings	250,000
Do. " by landlords, &c.	150,000
Occasionally	600,000
Harvest work in the United Kingdom equal to	50,000
	2,000,000

3°. *Incomes.*—In England the wages of the labourer are generally paid in cash, with the exception of an allowance of beer or cider during hay or corn harvest. The amount is very various, the rate in some counties being nearly double that in others. In Huntingdonshire, which may be taken as an average, first and second-rate servants may have, the former 12s. per week, and the latter 10s.; inferior hands from 8s. to 10s.

As the price of wheat rises above the ordinary level, the wages of the labourer are increased. This equitable rule is somewhat different in form in different districts, but the same in principle throughout. In some districts instead of giving an ad-

vance in money, wheat is allowed at a fixed price, while in other districts wages are regulated by the price of bread. If the half-peck loaf, for instance, is sold at 1s. 8d., the wages of the labourer may be 1s. 10d.; and if at 2s., then 2s. 4d. per day, or 14s. weekly, the sum which we paid in 1847 to common labourers—being an increase over that of 1845 of eightpence per day, 4s. weekly, or £10 8s. per annum. Some landlords and farmers, we believe, paid a higher advance, while others paid a less, so that this may be regarded as an average. The following accounts will exhibit the whole of a labourer's receipts under ordinary and high-priced years:—

First-rate Ploughmen, Cattlemen, and Shepherds under ordinary years.

	£	s.	d.
48 weeks at 12s. per week	28	16	0
4 " harvest at 22s. do.	4	8	0
Ale and other allowances	2	0	0
Yearly income of principal servants	35	4	0
Advance under high prices.....	10	8	0

Yearly income under high prices..... £45 12 0

Second-rate Ploughmen and Common Labourers.

	£	s.	d.
48 weeks at 10s. per week	24	0	0
4 " harvest at 20s. do.	4	0	0
Ale and other allowances.....	2	0	0
Yearly income of this class with average prices	30	0	0
Advance under high prices.....	10	8	0

Yearly income under high prices..... £40 8 0

The yearly income of a taskman may be thus stated, supposing that a loss of one week is sustained from bad weather during the whole period:—

	£	s.	d.
3 weeks at day work, during the year, at 10s. per week	1	10	0
41 do. making on an average 12s. 6d. at task.....	25	12	6
3 do. hay and pea harvest making 15s.....	2	5	0
4 do. at corn " do. " 25s.....	5	0	0
Beer and other allowances	2	10	0
Yearly income in this case	36	17	6
Advance under high prices.....	10	8	0
Yearly income under high prices.....	£47	5	6

The wages of boys regularly employed may be given, as in the following account, which will also exhibit the net income of an industrious labouring man and his family. The prices are about an ave-

rage of the real prices which we paid him in 1847, as taken from our private cash-book, so that the difference between the two is immaterial:—

	£	s.	d.	
Income of the father as formerly stated	47	5	6	
Eldest boy, 48 weeks at 7s 6d.....	£18	0	0	
Do. 4 „ harvest at 15s.	3	0	0	
Beer, &c.....	1	0	0	
		22	0	0
Second boy, 48 weeks at 5s.....	£12	0	0	
Do. 4 „ harvest at 10s	2	0	0	
Beer.....	0	10	0	
		14	10	0

Besides the above two boys we had occasionally a third, two sisters and the mother; the joint weekly earnings of whom were 11s.; and during harvest the latter was worth to her husband 12s. per week. If we say from this source only

6 4 6

Then the yearly income of the family will be..... £90 0 0

The incomes of labourers irregularly employed we cannot approximate with the same degree of accuracy. Their work is generally performed by the task—a system, although it has got many advantages to recommend it to both parties, yet, with a dense population, it is liable to be abused. Generally a few choice hands besides horsemen, cattlemen, and shepherds, are regularly employed during the whole year, while the majority are only called in during hoeing and harvest time. As soon as their services can be dispensed with they are dismissed, and the greater their numbers are in any district the shorter will be the period of their employment. They are not only dismissed when the jobs they have undertaken are finished; but, in the event of unfavourable weather intervening during the execution of these, so as to stop the process of hoeing or reaping, &c., the regularly employed taskmen have other jobs to go to, of a different kind, while they have to lounge about the village idle, in dubious uncertainty, for several days together, until a change of weather takes place. It not unfrequently occurs that a whole week transpires without a single day's employment, or wages coming in. At any time, a job on this farm and another on

that, a week here and a week there, is the manner in which this portion of our rural population is employed. The result as to yearly income is obvious; for, what from the loss of time by bad weather and between jobs, a general loss is sustained, amounting to a serious deduction—probably not less than from *one-third* to one-fourth of the wages of the other section of this class of labourers regularly employed. Such being the case, their yearly incomes may be stated at £25 on an average, and £35 under high prices, as in 1847, for crop 1846.

Women have from sixpence to tenpence per day. But, as outdoor labourers, they have a great many “broken days” from bad weather; so that the yearly income of the 37,383 cannot be estimated at more on an average for each than £10.

If we now suppose the average incomes of labourers regularly employed, including horsemen, cattlemen, shepherds, and taskmen, to be £35 per annum, the balance to men not regularly employed £25, boys regularly employed £16, irregularly £10, and women £10, then the following account may be taken as an approximation to the cost of manual labour applied to the English soil annually:—

Ploughmen, &c., regularly employed	482,166 at £35 .	£16,875,810
Taskmen, &c, irregularly.....	323,635 at 25 .	8,090,875
Boys regularly employed.....	100,000 at 16 .	1,600,000
Do. irregularly „	56,816 at 10 .	568,160
Women	37,383 at 10 .	373,830
Total....	1,000,000	£27,508,675

In Scotland, labourers are partly paid their wages in money, and partly in kind. There are very few exceptions from this plan in any of the counties. An unmarried man may have from £10 to £18 per annum, with bed and board; the difference in the wages of good and bad servants being always

computed in cash. Instead of their victuals in the farm kitchen, they frequently receive an allowance of oatmeal, milk, and firing, with a “bothy” in which to cook for themselves. Taking the average at £14, the boll of oatmeal (140lbs.) at 20s., then his income may be stated thus:—

Cash.....	14	0	0
6½ bolls of oatmeal at 20s.....	6	10	0
540 Scotch pints of milk at 2d.....	4	10	0
Firing, lodgings, allowances, &c.	5	0	0

Yearly income of a single man .. £30 0 0

Married men have houses with gardens contiguous to, or at no great distance from, the homestead. They have also a plot of potato-ground, and the privilege of keeping a pig. They may have the usual allowance of oatmeal and milk, or more according to agreement. They are generally considered more expensive servants to the farmer than single men, but more steady and care-taking. Both of them are regularly employed for the most part, so that there is not that difference among the incomes of the common labourers as in England: £30 may not therefore be far from a general average for the whole of the agricultural labourers above the age of twenty. Young men and boys under twenty, from the fact that they are generally boarded, or else receive an allowance of oatmeal and milk little short of that of the others, will maintain a higher average than the same class in England. For the same reason so will women. The former we may set down at £16, and the latter at £14 per annum. According to these figures, the following account will exhibit the total expense of manual labour in Scottish agriculture:—

Men.....	111,504	at £30 =	£3,345,120
Boys	39,854	at 16 =	637,664
Women	18,642	at 14 =	260,988
Total	170,000		£4,243,772

The income of the Irish agricultural labourer *bonâ fide* as such, is pitifully small. In other respects, the manner of hiring by the day or week, and the general mode of treatment, is analogous to that of England, with the exception that no advance of wages is made during high-priced years. Sometimes, although payment of wages is stipulated in cash, yet it is made in potatoes, either by an account-current opened for potatoes where the annual supply invariably balances to the full the earnings of the labourer, let him be regularly employed or not,

or else by a plot of potato-ground on the conacre system. Over a considerable extent of Ulster and in the neighbourhood of Dublin, wages are estimated at 1s. per day. In other parts of Ulster and the south, 10d.; but 8d. and 6d. are more frequent in the western and southern provinces than 10d.; so that 8d. per day is the highest figure which can be advanced for the average of the whole of the sister country. Some writers have even stated it at the half of this sum; but taking the whole, it only amounts to about £10 per annum when regularly employed. Now of the 2,000,000 we cannot say that more than the half are regularly employed, and the other 1,000,000 at half time; so that the yearly income of the whole, and the total expense of manual labour in Ireland cannot be estimated at more than £15,000,000, allowing the same wages to women, boys, and girls, as to men!

4°. *Number of acres cultivated, or quantity of work performed.*—In England and Wales there are estimated to be 13,150,000 acres under aration, exclusive of 150,000 acres of gardens. In Scotland, 3,355,000 acres, exclusive of 35,000 under gardens. In Ireland, 5,748,500, exclusive of 1,500 under gardens.

The management of grass lands consumes a large amount of the labours of the farmer, but the number of acres in this case affords no certain guide as to the measure of quantity in any comparative view. Probably the nearest approximation which we can make to it is to reduce the whole of the grass lands, woodlands, and wastes in each of the three kingdoms to a common level, according to their respective values and the values of the whole. Thus Mr. M'Culloch estimates the value of pasture and woodlands in England at £3 12s. per acre, and the whole at £61,614,000—this would give 17,000,000 acres of equal quality. In Scotland, pasture and woodland at £3—total pasture, woodland, and waste, £9,000,000, equal to 3,000,000 acres at this value. In Ireland, pastures, &c., at £2 10s.—total pasture, woodland, and waste, £20,000,000, giving 8,000,000 acres at the annual value of 50s. The whole, according to this estimate, may be tabularly stated thus:—

	Under the plough.	Gardens.	Grass lands, &c.	Total.
England and Wales.....	13,150,000	150,000	17,000,000	30,300,000
Scotland	3,355,000	35,000	3,000,000	6,390,000
Ireland	5,748,500	1,500	8,000,000	13,750,000
Total	22,253,500	186,500	28,000,000	50,440,000

5°. *The value of the agricultural produce of the three kingdoms is thus stated:—*

ENGLAND.		
Crops under the plough.....	£77,742,857	
Grass lands, &c.....	61,614,000	
Gardens		£139,356,857
		2,250,000
		£141,606,857

SCOTLAND.			
Crops under the plough.....	£18,219,286		
Grass, &c.	9,000,000		
		£27,219,286	
Gardens		525,000	
			27,744,286
IRELAND.			
Crops under the plough.....	£28,020,834		
Grass and woodlands.....	20,000,000		
		£48,020,834	
Gardens		180,000	
			48,200,834
Sum total.....			£217,551,977

We have thus arrived at a fruitful field for comparative reflection—more so, we are afraid, than what our limits will admit of being reaped, as will appear from the following examples:—

	Arable acres to each labourer.	Pasture.	Total.
Example 1.—England.....	13 $\frac{1}{2}$..	17	30 $\frac{1}{2}$
Scotland.....	19 $\frac{3}{4}$..	17 $\frac{1}{2}$	37 $\frac{1}{2}$
Ireland	2 $\frac{7}{8}$..	4	6 $\frac{7}{8}$
	Arable acres to each ploughman.	Pasture.	Total.
Example 2.—England.....	50 ..	74	124
Scotland.....	50 ..	44	94
Ireland	26 ..	41	67
	Arable acres to each common labourer.	Pasture.	Total.
Example 3.—England.....	30 ..	40	70
Scotland.....	159 ..	142	301
Ireland	7 ..	10	17
	Arable acres to each boy.	Pasture.	Total.
Example 4.—England.....	84 ..	109	193
Scotland.....	84 ..	77	161
Ireland	11 ..	16	27
	Arable acres to each woman.	Pasture.	Total.
Example 5.—England.....	351 ..	459	810
Scotland.....	186 ..	166	352
Ireland	11 ..	16	27
	Value of the produce of arable acres to each labourer.	Pasture.	Total.
Example 6.—England.....	£77 14 9	£61 12 3	£139 7 0
Scotland.....	107 3 5	52 18 9	160 2 2
Ireland	14 0 0	10 0 0	24 0 0
	Labourers.	Wages.	Return.
Example 7.—England.....	1,000,000	£27,508,675	£139,356,875
Scotland.....	170,000	4,243,772	27,219,286
Ireland	2,000,000	15,000,000	48,020,834

The foregoing tables fully bear out the truth of what was premised at the commencement of this paper—that a similarity of practice has not yet been established in the three kingdoms sufficiently clear to be recognised as a common index to the state of their agricultural industry; that differences exist, not only at variance with science, but of a character and magnitude affecting the health of the empire—differences, too, not only between the long-degraded sister country and England, but also be-

tween England and Scotland. Every labourer of the latter, it will be perceived, returns his employer from the comparatively poor soil of the north, £20 annually more than do those of the former from the richer soil of the south; and were the fertility of soils equal,* the difference would be still greater. But, even as it is, such a difference for each labourer is obviously a national shortcoming, which amounts to a sum equivalent to little short of Old England's rent-roll!

In Ireland, again, were the whole of her produce divided among her agricultural labourers, allowing nothing for tradesmen's accounts, tithes, rates, and the interest of capital invested by landlord and tenant, it would not advance them to a level with those of England. Hence the impropriety of those measures, purely political, so generally demanded by Irishmen to alleviate calamities arising from an imperfect state of labour. The elements of national labour are not organized according to science. Instead of subdividing labour Irishmen have subdivided land, than which scarcely anything can be more opposite.

The small farm system of the sister country is purely a remnant of the patriarchal times once enjoyed by all the United Kingdom; and, however well it may harmonize with the natural feelings of man, is unsuitable for him in the artificial state in which he has placed himself; for the infallible sentence, "Cursed is the ground for thy sake," has subjected every son of Adam to labour—the combination and subdivision of which the patriarchal system excludes. Hence, with the progress of science, the system has been abrogated in every province of Britain now in the enjoyment of comparative prosperity, and of necessity must be so before industry in a national sense can be established; for the amount of labour required by the small-farm system to produce a given effect is much greater than that required by the large. Ireland probably expends four times the quantity of labour in producing from her fertile soil £48,000,000 value of produce, which Scotland does in producing £27,000,000. We found, for instance, two Irishmen at one plough; and setting aside the character of the plough itself, its working order, and the tugging and twisting of the team, we would rather plough the 35 acres out and out than do the work which devolves upon the ploughman upon the headlands of the small fields of the sister country. At one period of our manufacturing history, one artisan performed the whole manipulations in pin-making, and probably did not finish more than twenty pins daily: now twenty are employed, and each manufacture 5,000 each in the same time. It would be useless for any one to open a pin manufactory single-handed, in modern times, on the plea of a want of capital or to give more employment, as is pleaded by more than small farmers of the sister country in favour of the patriarchal system. No person would make the attempt, much less listen to the plea of a want of capital, or an increase of employment in the making of a given number of pins; yet why is it attempted, practised, and pleaded in agriculture? Simply because the science of labour is less understood in that art than in that of pin-

making, and other arts where labour is subdivided.

It may be said that the subdivision of land instead of labour, in a national sense, cannot be pleaded as the reason why the agricultural industry of England falls so far short of that of Scotland. Granted: but there may be other patriarchal customs to which her farmers may cling with as much pertinacity as an Irishman to a conacre—customs on which our limits, as well as the subject, will only at present admit of a few remarks in conclusion.

England at one period, doubtless, shot far ahead of Scotland in agriculture, and continued to keep in advance until towards the end of the last century, when in an unpropitious hour she appears to have undervalued the proud position she was qualified to maintain, and to have fallen considerably behind her northern sister in the practice of this parent art. The energies of her people appear as if they had been engrossed in the commercial enterprise and the mental movements of this extraordinary period of her history. Her conquests and territorial extent of dominions abroad eclipsed from her view the more important value of her fields at home; and the first and noblest of the arts (that upon which all others depend) was seemingly acknowledged by her proprietary interest as of secondary consideration. Late years, however, have wrought a visible change for the better, and England is now again making laudable efforts to advance. There cannot be a doubt that, at the period we write, farms in England and also in Ireland are equally well cultivated as any in Scotland; and that the three kingdoms once divided, but now united, are prepared to go forward together in the march of agricultural improvement, as in every other branch of national industry. The science of labour will reduce the same principles to practice in the one country as in the other—the same economy and subdivision of labour may be studied in England, Scotland, and Ireland. The size of farms, mode of husbandry, and management of labourers, with their domestic economy, will be reduced, comparatively speaking, to a common level. Others than the agricultural labourers of each, however much they may yet show vestiges of former diversity, are fast approximating to a general uniformity of national appearance, language, manners, customs. In this they are assisted by the progress of science, by the power of steam-navigation and railways, and the facilities which those conveyances afford to society for commingling together, and exchanging sentiments upon all subjects of national interest. No doubt in England, among the lower classes more especially, the Scotch are still regarded with considerable jealousy

and suspicion—partly, perhaps, because of their numbers, and partly because of their preferment to many lucrative situations of trust and responsibility; while in Scotland, in like manner, the English settlers are looked upon with dissatisfaction; and no doubt, too, the English and Scotch who have become resident in Ireland; while others, who are surveying her patriarchal holdings with an

eagle's eye, are equally considered as unwelcome intruders. Yet these are the natural beginnings, and even more than beginnings, of the dissolution of national differences, of the repeal of parchment unions, and of the blending together into one mighty people three great nations, long disunited even in union, through the uncivilisation of their common natures.—Journal of Agriculture.

ON THINNING TURNIPS.

The all but general process of turnip-hoeing, which now meets the eye on almost every farm, reminds us that it is not improper to glance shortly at the practice and principles of *thinning turnips*.

This is an operation most generally performed by the hand; for, though several machines have been invented, and some of much merit, still not one could be considered as an entire substitute for the use of the hand. On flat-drilled plants, we have seen a small light harrow with *shares* instead of tines; and this was sent crosswise over the drills, and when the plants were very thickly set, it doubtless diminished the labour of thinning; and on ridged turnips we even saw a still more ingenious little implement called, "a turnip hoer," which consisted, in addition to a scuffer, of a series of rapidly revolving knives, which thinned out the plants at eight or nine inches, or any other given distance, according to the length of the knives—the interval between the action of each knife acting as a space which left the turnip plants standing.

But it is evident that powerful and useful as these implements might be in a very thickly standing crop of turnips—much as they might relieve the pressure, if the plants were taking harm from want of hoeing—they are quite inadequate to the purpose of *singling* out the plants; and all turnip growers agree, that the plants must at any rate be *single*, if any prospects of a successful crop are to be entertained.

Nor is it difficult to see the reason for this. The leaves are the lungs of the plant, and have to abstract the carbonic acid gas from the atmosphere, which exists in it in a very small quantity. A full-leaf process is required; and if they are crowded together, there is not space for that development which is necessary to their deriving the full benefit of the atmospheric influences. No more can they live crowded, than the inhabitants of a prison or a street can live in too close proximity. But more: the roots send out thousands of filmy radicles to search out and arrest the various matters in the soil calculated for their growth and development, and if too many of them interweave in the same

particles of soil, they rob each other of their legitimate nourishment, and thus we have a feeble plant, and a small and stunted crop.

The exact distance at which turnips should be singled out from each other depends upon a variety of circumstances—as, for instance, whether they are for pulling off when a large bulb is a *sine quâ non*, or for consuming in the land late in winter, when a smaller and firmer bulb is found to be more economical and more capable of resisting the winter frosts. As an average, however, the distance aimed at may be stated to be seven to nine inches; the former, as a minimum on light soils for eating on; the latter, as a maximum for stronger soils for pulling off. The question is, however, being raised where *weight per acre*, irrespective of quality, is an object, whether the distance is not too small? In beans we know that a distance of 27, or even 30, inches between the rows is often a great advantage in absolute weight of crop, and the question has yet, we think, to be tried, whether in the case of turnips a greater distance may not be the most advisable. Last autumn the Annandale Farmers' Club determined to have an inspection and weight of the turnips in the district—not for competition, but for information; they examined the turnips on as many as 34 farms, and they gave a tabular statement of the results of the investigation, which appeared in the March number of the Transactions of the Highland Society of Scotland. The average of the whole was—

	Tons. Cwt.	
Swedes, per imperial acre,	21	16 per acre.
Yellows, „	20	2
White, „	22	7

The drills averaged 25 to 30 inches apart, and we apprehend that the whole was sown in ridges. Now, as regards the thinning, we have this somewhat astonishing fact, that the turnips of Mr. Elliott, of Hardgrave, were thinned out not eight or nine, but *thirteen inches apart*. His land was reported to be very inferior; a few years ago it was, indeed, a moor, worth only 3s. per acre; and his return was, per acre—

	Tons.	Cwt.
Swedes	28	9
Purple Yellow	25	2
White Globe	26	10
Hardy Green	25	7

which is, we think, the highest average on the whole table. But he even goes further, and says that, when properly manured, fourteen inches is the proper distance. The distance between the rows is 28 inches. On this subject the committee of the Annandale Farmers' Club say, "The result of the weight in his fields, which are rather of inferior quality of land, as well as observation in other cases, induce the club to believe that at least this should in future be extensively and generally tried experimentally. Deficiency of manure (which, however, should never be), late sowing, or cold situations or soils, will, of course, be good reasons for modifying the extent of the practice in the first instance. It may be noticed, however, that in some cases—as at Milbank, Beckton, Kirkburn, &c., crops of 30 tons per Scots acre of swedes have been produced at hoeing from 6 to 7 or $7\frac{1}{2}$ inches. In the case of common white or red turnips, more especially with full-mixed manure, it seems *quite ascertained* that the general practice of hoeing at seven or even nine inches is much under the proper width."

Connected also with the thinning of turnips is the proper quantity of seed to be sown. This has a very important influence upon the future time, mode, and operation of thinning. A thick set of plants grow by far the most rapidly at first, seem to get best out of reach of the fly, and appear at least, more capable of resisting any evil influences; whereas a thin crop at first makes slow progress. But the hoeing of a thin crop may be much longer deferred, and is performed at much less expense than a thick one; and if, in the latter case, it be deferred to a very late period, and when ever it may be performed, it will be found to be much more difficult and expensive.

If all the seed grows, half a pound per acre will be found a very ample seeding; but the risk of all not germinating, the possibility of the attacks of the fly, &c., generally induce parties to sow three times at least, and possibly four times, and even, in some cases, six times that quantity. We think it safest to sow one-and-a-half pounds of seed, and prefer the *very thin* singling out of turnips to be tried only experimentally at first.—The Gardeners' and Farmers' Journal.

THE LATE MR. SMITH, OF DEANSTON.

There is a name well known in this country and wherever the spirit of agricultural improvement has penetrated, which should not be forgotten amidst the distraction of recent public calamities. A few weeks

ago it was our painful duty to announce the demise of Mr. Smith, of Deanston, one of the greatest public benefactors which modern times has produced. When we mention his name we call to the recollection of every person acquainted with contemporary history a long list of ingenious services in the cause of agriculture, manufactures, and sanatory reform, sufficient to entitle the memory of Mr. Smith to the warmest gratitude and respect of posterity. It is only, we believe, because of public losses which have absorbed all interest and attention, that the claims of Mr. Smith have not received the most emphatic acknowledgment ere this; and it is with the highest sense of the great benefits he conferred upon his country, that we now venture to mention his name.

Mr. Smith was almost equally eminent as a mechanician, a civil engineer, and a scientific agriculturist. He effected several improvements in machinery by which manufacturing processes were greatly promoted. He was patentee of the first self-acting mule applied to wool-spinning. The floating bridge erected by him at Gargunnoch, and the enormous wheel of the Shaws Water Cotton-Mill, are lasting memorials of his great abilities as an engineer. But it is probably in connection with agriculture that his name shines forth with brightest lustre, and will be longest remembered. He may be called the author of thorough draining and subsoil ploughing improvements, which mark a new era in the culture of the soil, which have immensely enhanced the value of land, enriched the proprietors, given employment and wages to thousands of labourers, and afforded increased supplies of bread to the ever-increasing millions of our population. Mr. Smith, indeed, is one of the fathers of agricultural science, and his name is indissolubly associated with that modern improvement in the three kingdoms which has caused the soil to assume a new aspect, and revel in a new fertility. It would be difficult to point to another name of the illustrious dead which has left so many memorials of itself—in the increased wealth and productiveness of almost all parts of Great Britain. Sanatory reform was one of the last works in which Mr. Smith was engaged, and on this subject he has left us many great and useful ideas to realize. We have lately perused a pamphlet printed by Mr. Smith in 1842, for private circulation, and addressed to Sir John Gladstone, of Fasque, in which he throws out ideas that are now embodied in the Drainage Act, and have been the means of doing incalculable good in all parts of the kingdom. The palace and the cottage have equally shared the benefits of Mr. Smith's labours.

It would be discredit to the country if so great a benefactor should go down into the dust without some durable tribute to his name and memory. The Royal Agricultural Societies of England and Ireland meet immediately; and the Highland Agricultural Society assembles here at the end of this month. These bodies will naturally be disposed to take up this subject; but we have deemed it our duty to express our opinions now, in the hope that an interest may be early excited in an undertaking which will reflect honour on the locality or the public body which is the first to engage in it.—North British Mail.

DISPOSAL OF REFUSE MANURE OF LARGE TOWNS.

The sanitary improvements which are going on, especially respecting the cloacæ of large towns, are bringing every day more prominently forward the important inquiry as to the best mode of disposing of them, so as to get rid of them in the most effectual manner, and still to make them available for the purposes of manure, for which they are most valuable.

There are two modes by which this is effected; the first is, by the use of the water-closet system, which sends the whole into the drains, and which, though very cleanly, and possibly healthy as regards the house, is very detrimental as respects the public, unless the drains are properly trapped and protected.

The other mode is by using the refuse matter of the house—the sweepings and ashes—partly as an absorbent and vehicle for facilitating the removal of the offensive matter, and partly to dispose of these accumulations of material, useless at least to the householder.

Now, as our great towns are the growth, in most cases, of a comparatively recent period, and as no provision could be made at that time for their subsequent growth, we have no hesitation in saying that the most of them have not any means for drainage, sufficient to carry off the refuse matter below; and hence it is necessary to make the best provisions possible for its present disposal; for the entire drainage and removal of the sewage of a town cannot be accomplished in a day; and how far the present state and appliances of the mode of removing the cloacæ of a large town may be improved by a very little attention, we need only give the remarks of an agricultural correspondent, who, having retired from farming, is now residing in a large town, and who therefore has before him the practical working of the whole matter. He thus speaks on Sanitary Improvements promotive of Agricultural Prosperity:—

“While much improvement has been made in other things, the want of it in privy accommodation is disgraceful to a civilized and populous country. The common construction of these necessary buildings, with their ash-holes attached, is such as to prevent the degree of effect which the ashes might have in deodorising and disinfecting the manure and preserving its enriching virtues, as might be, if those ashes were *daily deposited upon* the manure instead of being thrown *behind* it. The smell of those places is exceedingly offensive, and extremely injurious to the public health. This need not be, and therefore ought not to be so; for various cheaper and more effectual means might be found, instead of the

wasteful and expensive substitution of water-closets. These pollute the streams, and convert what ought to be a source of life into a messenger of disease and death. In many cases, where better means were wanting, it might be desirable to have each privy-seat made with a drawer or drawer-frame, in which should be placed a box with a couple of handles. Then let a cart go a regular round every morning, with a bell attached to announce its arrival. This cart should be so constructed as to carry forty or fifty boxes, empty or loaded, all made of a regular size. On hearing the sound of the bell-cart, those who desired their boxes to be emptied would open a door and give the signal, when a couple of men would carry in a clean box, with a small quantity of peat-charcoal or other deoderizer in it, and a moveable lid over it. This lid should also contain a small portion of peat-charcoal or gypsum, so deposited as to fall upon the contents of the loaded box, which should be immediately carried away with the lid of the empty box, which box is to be left in the place of the loaded one; the lids being made to fit any of the boxes readily and securely. These loaded boxes should then be taken altogether to the manure dépôt, which should be established at the outside of every town, from whence this most valuable manure might be easily conveyed in a light, dry, inoffensive state to the farms in the surrounding district. On reaching the dépôt, the manure should be immediately mixed with an additional quantity of peat-charcoal, so as to retain all its virtues and make it fit for the drill, which would sow it with the seed. To prevent the escape of noxious effluvia, and more perfectly to retain the efficacy of the manure, it would also be desirable to have some convenient contrivance for dropping gypsum upon it as soon as ever it is deposited in the privy. This might be done by means of a handy slide, so as to drop the needful quantity from a place in which the manure carriers would regularly deposit a small quantity of gypsum or some other kind of deoderizer. Some such contrivance might quite supersede the use of expensive and wasteful water-closets—being equally inoffensive, and profitable instead of wasteful. A plan of this kind would prevent the manure from being wasted and the water polluted as it is by means of water-closets, which carry their contents from the abodes of the wealthy to the habitations of the humbler classes. And this, bad as it is, is far from being all the evil that results from the use of water-closets or common privies. They generate noxious gases, which carry disease and death in atmospheric miasma even to those who heedlessly disregard the injury done to those beneath them, and the public in general. The immense waste of property and health which the public suffer from want of attention to these matters is almost beyond calculation; we can only form a very inadequate idea of it by the sums annually paid for guano and other manures and for foreign provisions, which we may confidently believe would be

unnecessary if all our own resources were properly economised. The subject is an important one, well worth the consideration of the legislature, the local governors of towns, and private individuals; and it is to be hoped that all will cordially co-operate so as to convert a common nuisance into a public benefit.* Let none fear that our foreign commerce will be injured by increased domestic supplies, for population usually increases or decreases in proportion to the increase or decrease of the means of living. But even if our foreign trade should suffer some injury, it would be amply compensated by an increased supply of employment and food at home."

Amongst the improved modes of dealing with solid cloacæ, the deodorising process of the peat-charcoal application, as recommended by Jasper W. Rogers, Esq., will hold an important part; and if its value as a manure is sustained—and we understand it is now being tested by the Yorkshire Agricultural Society and other bodies—we doubt not but it will be a valuable acquisition in facilitating the removal of fæcal matter, and rendering the privy system to a large extent innocuous.

The small confined privies attached to houses in crowded streets, lanes, and alleys; the effluvia escaping during accumulation, and the most offen-

sive and dangerous evolution of noxious gases during the removal of the accumulated fæcal matter—the droppings and losses in the streets, and with all the vast waste as regards agricultural value of the refuse matter so useful, are evils which demand some efficient remedy.

We understand that there has been introduced into the Borough of Leeds a very valuable machine for rendering the removal of cloacæ a cleanly and unobjectionable employment. An air-tight cart or covered cylinder has affixed to it a hose at one end and an air-pump at the other. The former is introduced into the ash-pit, and the latter set to work to pump out the air. The whole of the cloacæ, liquid and solid, rush into the vacuum, which when full is closely sealed, and then the whole is carried to any distance without loss or effluvia, or indeed any inconvenience whatever.

We believe the introduction of this invaluable contrivance is due to that public-spirited and warm-hearted man—Edwin Eddison, Esq., whose efforts in farming, are equal to his public spirit in promoting anything to improve the condition of his fellow-men.—Gardeners' and Farmers' Journal.

MR. JONAS WEBB'S SHOW OF SOUTH-DOWN RAMS.

On Friday, July 12, the twenty-fourth annual letting of this celebrated Stock took place at Babraham, Cambridgeshire. The weather proved exceedingly fine, and the number of agriculturists and gentlemen was larger this year than we ever remember to have seen it on almost any former occasion. Amongst those present we observed the Earls of Hardwicke and Chichester; the agents of the Dukes of Manchester and Bedford, and of Lord Walsingham, Lord Radnor, and Lord Ducie; the Hon. C. C. Cavendish, Mr. Whithead, Mr. Foljambe, Mr. Sheridan, M.P., Hon. — Liddell, Hon. and Rev. H. Yorke, Capt. Key, R.N., Messrs. Pym, Townly, St. Quintin, jun., — Huddleston, S. Batson, Esq., Saville Onley, Hicks, Barnett, Rigden; besides a large body of leading agriculturists from every part of the kingdom, and two from America.

The sheep were penned in the usual close before the house, and excited much interest and admiration. We could hear but one universal expression of approbation of their symmetry and great perfection of breeding, and that from the most eminent and impartial judges; this applies with particular force to the young sheep, and especially to two very magnificent shearlings, one of which let for 50 guineas, and the other 46 guineas on the present occasion.

It has given us much pleasure to find during the last 12 or 14 years, that Mr. Webb is not confining his attention to the breeding of Southdowns. By the introduction of the best blood, he has at length succeeded in breeding a large quantity of shorthorn stock. A herd in front of Mr. Webb's residence

attracted great attention on the present occasion, and was by able judges much admired.

The letting, in the unavoidable absence of Mr. Nockolds, was conducted by Mr. King. It is a singular but convincing testimony incidentally borne as to the value of Mr. Webb's flock in the prices they continue to realize, notwithstanding the depressed condition of agriculture. It was hardly expected prices could have kept their average; we find, however, that last year 62 were let before dinner on an average of £22 each; this year 60 were let averaging £22 10s. each. In 1849 Lord Ducie hired the highest price tup for 86 guineas, which his lordship retains this year on the same terms. At the present letting this nobleman hired a shearling at 52 guineas. The highest priced tup let this year was for 64 guineas to Lord Berwick. Mr. Stevens, from New York, hired one sheep at 35 guineas, and this gentleman, we understand, also purchased ewes of Mr. Webb previous to the sale.

THE DINNER.

After the letting, a large party of customers and friends sat down to a very excellent cold dinner collation. The Earl Hardwicke, Lord Lieutenant of the county, occupied the chair, supported on his right by the Earl of Chichester, Mr. Pym, Mr. Adeane, and Mr. Sheridan; on the left, by the Hon. Mr. Liddell, Mr. St. Quintin, jun., Capt. Key, R. N., and Mr. Barnett.

After the usual loyal toasts had been given from the chair and hastily responded to, that of the "Lord Lieutenant of the County" was replied to by the Chairman, and the "Army and Navy," by Capt. Key, R. N.

The CHAIRMAN said he should now propose the health of a gentleman who was but little known to them personally,

* As very large sums are paid for the privilege of collecting dust and ashes in London, there can be no doubt but this would prove a very profitable business.

having but recently come to take up his residence amongst those with whom it was his intention to live: he alluded to Mr. Adeane. (Loud cheers.) He had now the pleasure to introduce to them the eldest son of one of the best landlords that ever existed—a man, who, whatever might be his political views, had no other object in advancing and carrying them out than the promotion of the happiness and welfare of the people. He was one of the most conscientious men he ever knew; and if he had ever a criticism to make in his personal character, it was that his feelings of justice and kindness were so beautifully blended as to render it difficult for him to take any part which he feared might be attended with any evil results to any portion of the community. From such parents, coupled with the education they had received, they might reasonably entertain great hope of the offspring. He would give them the health of Mr. Adeane, the owner of the soil on which they were met (loud cheers.)

Mr. ADEANE, with much feeling, briefly returned thanks.

Mr. SHERIDAN proposed "Success to the Royal Agricultural Society of England," a society which had done much for agriculture, much for society generally, much for England as a nation. But for the existence of this society he did not believe they would have had the pleasure of witnessing the exhibition of sheep at Mr. Webb's on the present occasion. He would couple with that toast the name of the Earl of Chichester, the President last year.

The Earl of CHICHESTER said he was proud to belong to that society, because he believed that from its commencement up to the present time it had been conducive to the improvement of agriculture, and in no respect more conspicuously than in the stimulus it gave to the breeding of good stock. He might point to the history and example of Mr. Webb to show how much might be done by skill and industry and perseverance in the breeding of pure southdown sheep. He was one of Mr. Webb's imitators in the breeding of sheep, at a very humble distance; and he came there not merely for the pleasure of meeting an esteemed friend, and of seeing some very splendid specimens, but to take a lesson from the great master. He considered him one of the greatest benefactors to the agricultural world. As agriculturists, they had had lately to pass through a season of great difficulty and loss; and when a landlord addressed a large body of tenant-farmers, he ought to be ashamed of himself if he did not allude to these trials, from feelings of sympathy as well as those more selfish feelings, helping the pinch mutually with the tenantry. He could not help looking upon their present position with some degree of regret and dismay; still he was sanguine as to the future (Mr. S. Jones, "I wish to God I was!") and he had the personal satisfaction of feeling that, if there was one ray of light in the horizon, it seemed to begin to dawn upon the breeders of South Down Sheep. This was evidenced in the recently improved price obtained for their wool. He would urge upon them all to persevere, because, whatever happened to the interests of this county, there was no likelihood of the population leaving off eating South Down mutton; nor did he think, notwithstanding some recent reports in the papers, that they would abandon the use of woollen clothes (Hear, hear). He did not mean to say that he looked to any one particular interest for the prosperity of the whole county; but he firmly believed that on the success which attended the industry of tenant farmers very much depended the condition of the entire kingdom. He looked upon the gradual improvement in the condition of the people as full of hope to those interested especially in the prosperity of agriculture; no one could doubt but that this must benefit all classes, and the agriculturists would share in it. He differed with some around

him as to how this favourable state of things might be brought about; but that certain effects would result from the causes in operation he had referred to, no one would deny. The very success which had attended Mr. Webb seemed intended to cheer them by showing the success which his own industry and intelligence had brought to bear on one department. The noble lord concluded by expressing himself in terms of the most unqualified approbation of the specimens which had that day been submitted to competition.

Mr. PYM, in proposing the health of Mr. Adeane and family, expressed the great gratification he had in again being able to be present at this meeting to witness the triumph of honest industry and successful enterprise. He had always felt that these meetings taught a great moral lesson, in exhibiting what a tenant farmer should be, and what by industry and perseverance he might become. When Mr. Coleman, from America, was visiting this country to ascertain what was its social position, a few years since, he met him at Braybrook and offered to introduce him to Mr. Adeane and Mr. Webb, as a specimen of what our country gentlemen and his tenants should be—a good and liberal landlord, with enterprising and satisfied tenantry, and with a peasantry happy, contented, and thankful. He then told him he was but a specimen of what might be found in every county in the kingdom. And he remembered he instanced Lord Chichester, in Sussex, and the estate of his Grace the Duke of Richmond, near Brighton. As the responsible guardian of the family of the late Mr. Adeane, he felt a peculiar pleasure in introducing the two eldest sons to the meeting, and he would urge them to follow in their parents' steps.

Mr. S. JONAS proposed the health of their chairman, and alluded to the frequent kindnesses he had conferred upon them by presiding on previous and present occasions similar to this, and to the great ability with which he discharged the duties of president at the Royal Agricultural Society, when their great meeting was held at Derby.

The CHAIRMAN thanked them for the compliment paid him. He said he was delighted with the stock shown to-day; every year was a proof that Mr. Webb did not stand still, but that his stock was improved; his name he had an opportunity of knowing was well known in all the great markets and capitals of the world. He was an instance to show how a man might raise himself as a tenant-farmer to become as useful a member of society as the statesman, or the politician, or the lawyer. He remembered hearing a man, who came from America to visit this country, asked what particular objects struck him most, and he said, the Archbishop of Canterbury, and Mr. Webb's tups (loud laughter). Lord Chichester had told them that he was sanguine as to the improvement which would so shortly take place in agricultural prospects: he wished he could see this as clearly as Lord Chichester; they must, however, remember that the voice which told them so came from the *Downs*, and the *Downs* were just now up (laughter)! He should like to know what the *clays* would say to that! There was as great a difference between the condition and prospects of the *clays* and the *downs*, as between the Archbishop of Canterbury and Mr. Webb's tups. In order to show that the *Downs* were looking up a bit in the world, he would read them an extract from the Board of Trade returns in reference to woollen manufactures. This return would tend to raise the hopes of the wool sellers, whom he would advise to look out a little bit. In the year ending June 1848 the quantity of woollen manufactures imported by the yard was 2,203,540; in the month of June 1850 it was 7,157,622 yards. Throughout the whole of the woollen trade the increase was in the same

ratio, although for brevity he only referred to the increase in exported goods by the yard. Taking the first five months of the present year, and comparing them with the corresponding ones of 1848, the same result was apparent. In 1848 it was 10,908,794; in 1850, 23,617,142 yards (Cheers). On the subject of the Downs, therefore, no doubt there was a ray of hope in the horizon; but, alas! their noble and worthy friend did not live in Cambridgeshire. It was impossible to disguise the fact that the farmers of this country were living under a great experiment (Hear, hear; and a voice, "and a precious sharp one too!") Those who suffered from it had a right to call for justice from the other side. No doubt they must exert themselves, and he had no doubt but that if they did, such was the great energy of the Anglo-Saxon race, wherever found, they would be able to drive the present system from their statute book as they once drove the foreign invader from their shores. Still they were not fairly treated, inasmuch as the present experimental legislation was based on false premises, and assumed advantages they did not nor ever had possessed. The Chairman gave, in conclusion, *the toast of the evening*, "The Health of Mr. Jonas Webb" (loud cheers).

MR. JONAS WEBB expressed his gratitude for the kindness he yearly received by the increased number of friends who frequented and supported his sale; this it was which gave him encouragement to pursue the path he had adopted with increased zeal. He felt delighted to see his future landlord at the table; he belonged to an excellent stock, and he should never forget the numerous acts of kindness he had received from his late respected father. He was sure he would remember that meetings of this sort brought them more and more closely together, and that if anything could estrange them it would be because they did not meet more frequently. Their noble president had referred to the improved prospects of the wool trade; he believed if they held their wool a little longer they would raise the price 3d. per lb. He had heard with regret that there were some of his friends who could not obtain room; all he could say was, that if he lived till next year he would throw half the field open to accommodate his customers and friends.

THE HON. MR. LIDDELL proposed "Prosperity to Agriculture."

THE CHAIRMAN proposed the health of Lord Berwick, the hirer of the highest priced tup.

THE HON. MR. LIDDELL proposed—Success to Agriculture, coupled with the name of Mr. Pym, and urging the unfairness and national impolicy of exposing the unprotected Home produce to competition with the comparatively untaxed foreigner, and the impossibility of farmers living with wheat at 5s. a bushel.

MR. PYM, in returning thanks, referred to a speech which he made some 25 years since at a public meeting in the Town Hall, at Cambridge. In this speech he propounded a sentiment

for which he was called to order by Lord Fitzwilliam. He said he believed national prosperity to depend upon the prosperity of agriculture. Lord Fitzwilliam said "No—national industry was the basis." True, my good lord; but national agriculture formed almost the entire basis of national industry. With respect to Free-trade, one thing often struck him—that many of those who talked much about it knew very little of the subject. (Cheers). He would, however, with great confidence, assert that the Government would rue it if they gave to agriculture a blow more severe than she was now suffering from. Upon one occasion he had ventured to oppose, at a public meeting, the great and deeply-interested champion of Free-trade—Mr. Cobden. Mr. Cobden told him that if his ancestor, whose name history had made famous, were there, he would have taken what he was pleased to designate a more rational course. His (Mr. P's) answer was that he believed that the desire both of himself and ancestor was similar: they both desired the good of their country, and they both desired to attain it by constitutional means, not by agitating it from one end of it to the other, sowing discord between landlord and tenant, and misrepresenting facts bearing on one particular class. He wished to see tenants in fair and easy circumstances, able to bring up their families respectably, and not obliged, after years of toil, and a large expenditure of capital, to look at their wives and children, and say, "And is it come to this, that we are to be made the victims of a cruel and heartless experiment to serve the whim or caprice of a few agitators?" Mr. Pym concluded by drawing a picture of what would be the inevitable result to the agricultural labourer, if from the pressure on the tenantry land was no longer able to be retained in cultivation.

THE CHAIRMAN gave the health of Mr. Rigden, from Sussex, an eminently practical man, and wished their legislators would seek advice of such men as he, rather than apply to certain gentlemen whom he would not name.

MR. RIGDEN said, in reply, that they had a gentleman in Sussex, whose name he should not mention, who had written to prove that under the blessings of the free-trade system they were better off than under the old one (cries of, *That's J. V. Shelley*). Now, if that gentleman would come down here and convince them of that, as far as the county of Sussex was concerned, they should be very happy to spare him. He wished more Sussex friends had accompanied him to-day; he feared this was partly attributable to a certain amount of prejudice. He had none of that about him, and he went where he could find the best animal; and they could not, he felt sure, find in the whole county of Sussex such a show of Southdown sheep as they had that day witnessed.

The above toasts were followed by the health of Mr. Webb, sen., Mr. Barnett, and fox hunting, &c., Mrs. J. Webb, and family. After which the Chairman left, and with him the greater portion of the company.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

DORCHESTER, FEB. 8.

From the well-wooded, sheltered, and genial valleys of Devon, to the bare, exposed, and chalky downs and uplands of Dorset, the change is so

great and marked that one would hardly suppose them to be adjoining counties. The kindly climate, the productive soil, the undulating perspective, clothed with luxuriant verdure and gladdened with

refreshing streams—all these attributes of the district we have just left behind us are no longer to be met with in that upon the survey of which we are now engaged; and in their stead we have open tracts of land, partly devoted to tillage and partly to pasture—where the swelling outlines of the scenery indicate the character of the formation beneath—where trees, instead of spreading over and embracing the soil, are collected together in masses—where the fields again widen to a size adapted for the development of skilful husbandry—and where nature seems to invite, for the improvement of her hungry-looking surface, the comforting and enriching appliances of agriculture. Certainly a first view of Dorset is hardly so prepossessing as its situation on the map might suggest. The timber looks stunted in growth, and forms so small a feature of the landscape that the copsewoods attract notice. These serve a useful purpose, for the hazle, of which they generally consist, supplies hurdles to the farmer for folding his sheep, and fuel to the labourer in the absence of coal. They are cropped every seven years, and are looked upon with sufficient favour to find a place on most of the large farms as a part of their internal economy. The hedge-rows of Dorset are reduced in size and number, and furnish no reasonable ground of complaint. The inclosures of tillage-lands are quite large enough for the purposes of husbandry. The downs appear to want shelter for the sheep grazed upon them. Small hamlets, formed of labourers' cottages, are seen at distant intervals, but a considerable proportion of the rural population reside upon the farms upon which they are employed. The country generally has not the appearance of being thickly peopled, and the space intervening between each homestead indicates that the holdings are more extensive than usual. As for the soil itself, it is thin, the chalk usually betraying its presence by unmistakable signs within a very few inches of the surface, and sometimes being laid completely bare. Beds of gravel and clay are of no unfrequent occurrence; but whatever varieties of formation it presents, the land which occupies the central parts of Dorset does not appear to be possessed of much natural fertility. As might therefore be expected, the rents in this district are low; the average, including rates and tithes, being from 16s. to 20s. per acre. Of course some lands let higher, the amount per acre being in some degree regulated by the quantity of down pasture attached to a farm. That quantity is usually in the proportion of one-half to one-third, but on some holdings there is none at all, and in such cases, the land being of superior quality, the rent presents a corresponding increase. For some years the downs yielding inferior grass (and least profitable for pasture) have been ploughed up and cultivated, and thus the whole average of grazing land in the county has of late been considerably decreased, to the joint advantage of tenant and landlord. With this gradual conversion the system of farming pursued was also changed. It used formerly to be the custom for the larger tenants to have a dairy as well as a sheep stock; but that twofold management is less in favour now, and sheep usually occupy their undivided attention. The small tenants, however, still continue

in their practice to combine dairy and arable farming. The holdings of this class, which are chiefly in the low grounds, average from 100 to 200 acres, and their management, from the want of capital and skill among them, is said to be very defective. They are suffering severely from the present pressure, and many of them, we are informed, if low prices continue, will be unable to retain their farms much longer. The produce of the Dorsetshire dairies being principally butter, they, like the dairies of Devonshire, have suffered less than, for instance, those of Gloucestershire, where cheese is produced. The depreciation in the latter case was, it will be recollected, from £9 to £6 10s. for the yield of a cow, while here and in Devon the yield of a cow has only fallen from £10 to £9.

Inquiring into the relations between landlord and tenant in order to ascertain how far these furnished any legitimate grounds of complaint, we found that farms were in the majority of cases held by yearly agreement, and that the present depression in prices appeared to make this species of holding more acceptable to the farmers than it hitherto has been. Leases for terms of years varying from 7 and 10 to 21, are also not unfrequent; and although tenants do not view them so favourably just now as previously, yet they state that the certainty of possession thus given has proved very beneficial to the cultivation of the soil, and has encouraged largely the investment of capital and the display of increased skill in improvements. Many of the largest and best farms are held under lease; and tenants from year to year, though perfectly satisfied with the conditions on which they themselves hold, as regards the present times, generally give it as their opinion that leases are more advantageous for the permanent interests of agriculture. On the estate of Lord Orford, not only are leases granted, but the rent payable is a produce rent, being determined in amount at each half-yearly payment by the market price at Dorchester, for the preceding six months, of so many bushels of wheat and barley. His Lordship's tenants appeared to approve greatly of this mode of adjusting the question of rent; but we could not ascertain that the example had been at all followed by other proprietors in the county. The manner in which the present crisis is usually met in this district, if met at all, is by a deduction of rent, and we understand that this has been done to a considerable extent. Hardly any other arrangement appears to have been made by either of the parties most interested to meet a new order of things. The best farmers say that they are waiting to see how free-trade will work before coming to an understanding with their landlords; and when asked if they propose remodelling their system of cultivation, so as to suit, if possible, the altered circumstances around them, they generally reply that their system admits of no change and is the most improved that they can practically adopt. In the meantime they have discontinued to a considerable extent the purchase of artificial manures, stopped the ploughing up of their down pastures, and diminished as far as possible the more expensive and generous cultivation which the hungry character of their chalk soils has hitherto induced them to pursue, and which they

state that they have up to the present depression followed with advantage. We were assured that want of capital is a common evil among the farmers of this county, and that men very often take large holdings which they are not able adequately to stock. The principal tenants, however, are not unfrequently possessed of property independently of their immediate pursuits. As to the landlords of this district, the system of agriculture pursued is such as to bring them less in contact with their tenants than is the case in many other parts of the country—drainage and extensive farm-buildings for cattle not being considered requisite, and the tenant, though generally bound by conditions of agreement to observe certain rotations of crop, being, in fact, left to do pretty much as he thinks proper. There seems to be a good understanding between the two classes, and less of that struggle for a permanent reduction of rent which we have traced in other counties. In fact, labour appears to be the question which the present crisis has brought most prominently forward here. That subject, however, we forbear entering upon till we have made further inquiries with regard to it.

The chief characteristics of the farming of Dorset are the breeding of sheep, and the folding of them to enrich the ground for the production of corn. Its thin chalk lands yield naturally a very scanty herbage; but when tilled and well-manured, the alternate crops being eaten on the ground by sheep, they bring good returns to the cultivator. The tillage farms, as has been already mentioned, are extensive, and most of them include a range of down or sheep-walk, which is not permitted to be ploughed without the consent of the landlord. On this the ewes are fed during the day in summer, and driven to the arable grounds, where they are folded at night; thus carrying the dung of the grass lands on to the arable to enrich it. The points chiefly considered are the production of wheat and barley, and to promote these the breeding and management of sheep, and the other operations of the farm, are subordinate. The maxim is, the greater the number of sheep the greater the quantity of corn; so that the course of cropping, though uniform in principle, is varied in detail, according to the greater or less extent of permanent grass or down land which a farm contains. Thus, a farm consisting of one-half of down land and one-half of arable is farmed on the four-field system; while another, with only one-third of down land and two-thirds of arable, may be farmed on the five-field rotation, both systems being thus made to afford nearly an equal proportion of grass-land for the feeding of sheep. Each method is carried out much in the same way, only the seeds are left a year longer unploughed in the five-field than the four. Beginning with the wheat crop, the land, after the second crop of clover being fed with sheep, is dunged from the farmyard and then ploughed, pressed with the furrow presser, and sown, the wheat-seed falling into the hollows made by the presser, where it is covered by the harrows. The more common plan, however, where the furrow presser is not used, is to harrow the ground after it is ploughed, and drill-in the seed with the Suffolk drill. To give it that degree of solidity which on chalk lands is found advan-

tageous, 700 or 800 sheep are driven backwards and forwards over the field, the shepherd beginning at 5 o'clock in the morning and keeping the sheep on the ground three hours, by which time they are found to have gone sufficiently over something like 10 acres. This is repeated day after day till the whole is accomplished. When the wheat crop is removed one-half of the ground is ploughed and sown, part with rye and part with winter vetches for spring feed. The other half is manured during the winter by the flock of sheep being brought from the land on which they feed during the day, and folded there at night. This part is in the ensuing spring prepared for swedes, which are sown in June, and is followed by the sowing of white turnips on that portion on which the rye and vetches have just been eaten off. A few of the swedes and turnips are taken to the farmyard for consumption by the cattle, and the rest are fed off by the sheep. This is followed by barley, one-half of which is sown with clover seeds. The barley, when ripe, is mown with the scythe, and carried and stacked without being tied in sheaves. After the crop is removed, the half of the land which was not sown with seeds is dragged, and part of it sown with scarlet trefoil and part with rye. The first crop of clover is usually cut, the second eaten off, as also the rye and trefoil. After the rye, which is first consumed, the land is sown either with mustard to be ploughed in for manure, or with rape to be eaten off. It is then ploughed for wheat, which again commences the course. When the five-field course is adopted the clover is pastured the second year; or a portion of the land is dunged and ploughed in spring and sown with peas, which are followed by wheat, as before.

During this course the ground is repeatedly manured. First, the clover is fed off and dunged for wheat; secondly, the wheat land is trodden by sheep after being sown; thirdly, the wheat-stubble, after being ploughed, is folded over by sheep, and the rye and winter vetches are eaten on the ground as a preparation for the turnip crop. The swedes are manured with ashes and artificial manures, and the greater proportion of the whole turnip crop is afterwards fed off in preparation for barley. When peas are sown the land is previously "muckled," that is, straw is carted out and spread over the ground, the whole of which is then folded with sheep, and the straw and manure ploughed in together to enrich it for the peas. This constant manuring might be expected to force good corn crops, yet the average produce per acre of wheat is said not to exceed 20 to 22 bushels, and of barley 32 bushels. An explanation of this may perhaps be found in the fact that the sheep are a breeding stock, never very highly fed, and that year after year the land produces and parts with a crop of wheat, barley, lambs, aged ewes, and wool, for which the moderate quantity of purchased manures brought back to the farm is certainly not an equivalent. The folding of the sheep on the arable from the pasture and down-land no doubt enriches the former at the expense of the latter, but does not in any degree, on the whole, make good what is thus annually abstracted.

It is usual to chalk the land once in 20 years,

the sour description of soil being that to which it is found most advantageous to apply it. The chalk is dug out of pits in the field to which it is applied, and it is laid on sometimes with barrows, but more cheaply with the aid of donkeys. The first method costs 40s. an acre; the last, 35s. where hired donkeys are used, and 20s. to 25s. where the donkeys are the property of the farmer. The chalk is laid on in large lumps, which soon break down by the action of frost and exposure to the weather. Chalk is occasionally burnt and applied as lime, in which state it is preferred by many farmers, notwithstanding the increased cost of the burning.

The hollows or valleys in most of the large farms are occupied by water meadows, which seem to be carefully managed, and furnish very useful early feed for the ewes and lambs and hay for them in winter.

The sheep generally kept are South-downs, which have in most instances superseded the old Dorset breed. The ewes are now dropping their lambs, and are driven every night into a warm littered yard with sheds all round, where they are carefully watched and tended. As they lamb they are drawn with their lambs into the sheds, and separated from the rest of the flock. Next morning they are put into a well-sheltered pasture, where they are supplied with swedes on the ground. In a few weeks, when the lambs are strong, they will be placed in the fold on swedes, and afterwards on rye and vetches. The lambs are weaned in May, and shorn when six months old. The "pen" or wedder lambs are sold in autumn, as also the four-year-old ewes. The number of lambs annually reared from the flock of ewes varies exceedingly, but scarcely ever in any case averages a lamb for each ewe. From a flock of 700 ewes shown to us the shepherd had on one occasion gained the prize of his district for rearing 670 lambs; but this was regarded as quite uncommon, 500 to 550 being reckoned a good produce. The losses by death, both of ewe and lamb, in lambing, are some years very great; the owner of the flock above mentioned having assured us that one season he lost as many as 300, stating at the same time that he was unable to account for this. We incline to think that the daily driving of the ewes while in lamb from the feeding ground to the fold and back again—often a mile or more both ways—the close and crowded state in which they are nightly confined, the perambulation of the wheat fields, and the other uses to which these peripatetic manure-spreaders are applied in Dorset, very reasonably account for the mortality and scant produce described. Previous to the introduction of guano and bones, and more recently of cheap feeding stuffs for stock, the practice of folding enabled the farmer to produce fair crops of corn on land which could not then have been otherwise kept in tillage with advantage. The high value of the corn made the care of the flock a minor consideration. Free-trade has changed these relative values, and there can be no doubt that the sons of the men who introduced the practice of folding will soon adapt their management with equal skill to the different position in which they are now placed. The increased use of artificial manures and bought food, the general introduction of the turnip-cutter,

a greater economy of straw, and its conversion into rich dung, will gradually change the present system of breeding sheep into that of feeding out their produce also, thereby increasing the annual return from stock, and by the consumption of better food adding fertility to the corn land. Folding as a system will probably be superseded by attention being devoted to the feeding of the flock as the principal object, the enriching of the land following as a matter of course, but not forming, as heretofore, an object paramount even to the welfare of the stock. It may then be found that to enrich the soil by wasting the substance and injuring the constitution of the sheep in driving it to and fro, and confining them in a crowded fold, is a more expensive and less effectual plan than the direct application of those manures and food which science and commerce have placed within the reach of the modern farmer. Nor is this the only mode of increasing his returns which the Dorsetshire arable farmer fortunately has still to fall back upon. On these thin chalk lands we were surprised to find that, in order to consume their straw, the farmers carried it out and spread it over the soil, where, after the sheep had been folded upon it, it is left exposed to the weather for weeks or months before being ploughed in. Its economical consumption by cattle in stalls, with the aid of roots and cake or corn, will no doubt ere long be found by the farmer a much more profitable mode of converting it into a source of gain to himself and of fertility to the soil.

SHAFTESBURY, DORSET.

Any account of the agriculture of Dorset would be very incomplete without some description of the farms of Mr. Huxtable. This gentleman, the rector of Sutton Waldron, by his pamphlet on *Present Prices*, has raised such a storm of reprobation among the farmers of the several districts through which we passed, that we were anxious on every account to examine his system and obtain accurate data for forming a correct judgment upon it. It may be necessary to premise that Mr. Huxtable is a self-taught farmer, and that in carrying out his plans he has intrusted them to the direction of the people he found on the land, without calling to his assistance the aid of a skilled bailiff. The out-door work, therefore, wants that *finish* which a tasteful farmer likes to see in the management of his land. The West Farm, about a mile from Sutton Waldron, is the first on which Mr. Huxtable commenced his improvements. It is very various in quality, but chiefly a rather wet and tenacious soil, now drained, and all superfluous hedgerows and timber removed from it. This is strictly a breeding farm, keeping a stock of milch cows, the calves of which, when reared, are removed to the Hill Farm to be fattened. There is nothing peculiar about the management of the stock here which will not be detailed in the description of the Hill Farm, so that it is only necessary to call attention to the plan adopted by Mr. Huxtable for the cheap distribution of liquid manure over the different divisions of this farm. The whole liquid is carefully collected in a series of tanks, from the lowest of

which it is discharged as required by a force-pump into pipes, which carry it to the several fields in succession. The pipes are of well-burnt clay, an inch thick, their joints secured with cement. They cost 7d. a-yard, and, inclusive of an upright discharge column every 200 yards, will not exceed £1 an acre. The pipes and columns are now laid down for the accommodation of 60 acres of the West Farm. When it is requisite to apply the liquid to any portion of these 60 acres the force-pump is set to work, and a stop put on at the discharge column nearest the place to be watered. A hose is then attached to the column and carried into a tub placed on a light broad-wheeled water-cart, which, as soon as filled, is drawn off, and another of the same kind put in its place. The first is then emptied by a man with a bucket, who scatters its contents over the land. By the time he has emptied the first tub the second is full, and he repeats the same process with its contents, and so on, the man at the forcing-pump being thus enabled to deliver a continuous stream of manure at the distance of many hundred yards. We think no apology necessary for occupying some space in describing this process; for the application of manure in a liquid form, fitted for immediate absorption by growing plants, is a matter of the highest importance to the farmer. The time may soon come when all manures will be first prepared in the dissolving tank, and then carried, in a liquid form, without waste or expense, and applied without injury to the surface at any stage in the growth of the plant which may be deemed advisable.

The Hill Farm is the most interesting, for here Mr. Huxtable has most elaborately carried his science into practice. A few years ago this was an open chalk down—it is bare and barren, high and windy, rising abruptly from the adjoining vale to an elevation of 500 feet. Its cultivation was undertaken chiefly with the object of increasing the field of employment in the parish; and not only has that object been accomplished, but problems having an important bearing on our national agriculture are here in course of being solved. The farm consists of 280 acres of land, all of which bear every year alternate crops of corn and cattle food. The corn crops are wheat and barley, the former of which will average this year 36 bushels an acre; the green crops comprise white and yellow turnips, swedes and mangold, the latter of which especially was a heavy crop; and also rye, vetches, clover, and Italian rye-grass, though the last is not in great favour on this farm. Implements of every kind for economizing and perfecting labour are in requisition, cultivators, scarifiers, clodcrushers (the most approved of which is the smooth-ringed, as not being so liable to choke in damp weather), seed-drills, dibbling machines, and liquid-manure and seed-drill. At this season the operations on the land are not so interesting as those going on in the buildings, the meat and manure factory of the farm. These comprise an extensive range, not altogether on the most convenient plan, as additions and alterations are constantly being made when more room is required, and when experience and observation suggest a better arrangement. They are constructed, however, with a strict eye to eco-

nomy, both of expense and labour, and there is not a nook about them which the critical eye will discover as either unnecessary or very inconveniently situated. The whole stock of the farm, except the breeding ewes, are kept constantly housed night and day, summer and winter, and no particle of their food or manure is suffered to be wasted. Beginning our description with the steam-engine—it thrashes and winnows the corn, cuts the thrashed straw into chaff, turns the stones for grinding the cattle-food into meal, and by a separate belt, when requisite, works a bone-crusher, in which, also, the hard American oilcake is broken down. Over the furnace is a drying-loft, where beans or damp corn are prepared for the better action of the millstones by the waste heat of the engine fire. The straw-chaff is carried to the root-house, where, by Moody's machine, turnips, mangold, &c., may be described as ground down rather than cut, and the roots and chaff are then mixed together in the proportion by measure of one bushel of the former to two of the latter. The cut straw sticks to the juicy fresh-cut roots, the whole exudation of which it absorbs. This mixture forms the staple winter food of the cattle and sheep, cake and corn being added in such proportions as are deemed necessary. The cut straw is not, even in this state, thought so soluble as it should be, and a large steaming-chest is being erected, in which the steam from the engine-boiler will be employed in rendering every substance used as food in the fittest state to afford its entire nutritive powers to the animal. The mess so prepared will consist of cut straw-chaff, ground roots, meal, oilcake or bran, and crushed furze; for Mr. Huxtable turns nature to account in all her productions, and the scrubby furze, which is, except in Wales, generally looked on as a nuisance, is here enlisted into the service of adding to the nation's food. After due inquiry, he satisfied himself that, properly used, this is a most nutritious substance. It becomes, therefore, an object of careful cultivation, and when crushed and steamed in conjunction with other materials adds a flavour to the whole, which, besides its nutritive qualities, makes an extremely palatable mess for any animal to which it is given. Some people, no doubt, will say that steaming reduces the bulk of the roots, and is therefore a wasteful plan; but in the process, as here carried on, nothing is wasted; the bulk which leaves the turnip swells and melts the chaff, and, carried into the paunch of the animal in this state, cannot produce that chilling effect which a mass of roots, containing 90 per cent. of cold water, must necessarily cause. Such is the winter food of the cattle and sheep. Pigs are treated differently. They are kept as a manure factory, from which a given expenditure in meal will be returned, with the cost of attendance, in the increased value of the animals, and all the manure they leave be clear gain. When this is reduced to a certainty, our supply of the richest manure will be limited only by the means at our command for purchasing pigs and corn, and it is right to mention that at the present prices of both a handsome profit was this year made by Mr. Huxtable over and above the manure. The pig food is therefore all purchased exclusively on their account, partly in

the market and partly from the inferior corn of the farm. Cheap Egyptian beans, lentils, and barley, are ground into meal, the proportion of beans being increased in cold weather, and barley in warm weather, as being then respectively most suitable to the constitution of the animal. The requisite quantity is steeped over night in cold water, to render it more palatable and soluble, but undergoes no other preparation.

Having described the machinery for the preparation of the crops and the management of food, we shall now proceed to the buildings in which the different kinds of live stock are accommodated. The average stock of cattle kept is 30 milch cows and their produce, the whole of which are constantly housed, the younger being promoted from stall to stall as their elders depart under the butcher's charge to fulfil their destiny. From 90 to 100 head are thus regularly kept on the farm. The cattle are all tied up in stalls, occupying three parallel rows, with plenty of light and air, and exhibit, notwithstanding constant confinement, the greatest liveliness and contentment. To economize as much as possible every particle of straw, they are all placed on sparred boards raised 6 inches above the water-tight floor, and by this arrangement fully half the usual supply of straw for litter is saved. The liquid is collected in an underground drain, whence it passes off to the tank. The cattle-house is very cheaply constructed, the walls being of wattled furze, which admits air without producing a draught, and the roof is thatched with straw, as being not only more economical in first cost, but far better adapted than a slate or tile roof to insure an equable temperature, being warm in winter and cool in summer. This point is well worth consideration, as we were assured that under one part of the buildings which was slated the stock are much annoyed in warm weather by flies, which scarcely ever make their appearance under that portion which is covered with thatch. The sheep-house comes next under observation. It is a light, cheap, thatched building, with a walk up the centre, and a double row of sheep, standing on sparred boards, and tied up by the neck, quietly feeding on either side. Mr. Huxtable first tried his sheep in small pens on boards, but they never became so quiet and docile as they do after being tied up a day or two by the neck. The progress of the sheep is tested at intervals of a fortnight or more by placing them on the weighing machine; and it has been observed that, from some unexplained cause, they at certain periods seem to make little progress as compared with others. When this is noticed, the house is carefully washed with chloride of lime, which seems to have an invigorating effect on the animals. They are found to thrive and fatten rapidly under this system of house-feeding. The solid manure is removed daily, and the liquid passes off by a covered drain. No litter whatever is required by the sheep. The accommodation for pigs next demands attention. Two methods are adopted, the one most approved being a long low thatched building, with a walk up the centre, and divided into compartments on each side. The pigs all stand on sparred boards, beneath which the ground is shaped like the letter V, for the collec-

tion of manure. The solid portion is removed at convenience, the liquid passing off by a drain to the tank. 80 or 90 pigs are kept on the farm, and seeded in a state of perfect contentment with their quarters. It is unnecessary to describe the root-houses and farm-stable; but, crossing the road, we enter a building isolated from the rest, and divided into loose boxes, to which the milch cows are removed when about to calve. This house is also used as a quarantine, in which are kept for a few weeks any animals that are purchased, and which must first pass through this ordeal before being admitted to free pratique in the rest of the farm-buildings. A little way further down is the establishment for the collection and preparation of manure. It comprises two extensive water-tight tanks for liquid, and a house in two compartments for the different kinds of solid manure. Here every element that is not carried off in the substance of the cattle, the sheep, and the pigs, is carefully preserved, to be again in due time restored to the soil, and the slender stream which constantly runs into the liquid manure tank is directed into a box filled with gypsum, through which it is passed, in order to fix the ammonia, described by Mr. Huxtable as "the spirit-like essence of the farm—ever longing and struggling to fly off into boundless air." It would occupy too much space to detail all the other processes going on on this farm, the dissolving of bones, the extraction of ammonia from rags, the conversion of earth by fire into an absorbent of liquid manure—all these must be examined to be thoroughly appreciated. The practical farmer will ask, Does all this pay? For crop 1847 Mr. Huxtable's books show a balance in his favour. For crop 1848 he was a loser of £26 9s. 8d., after paying rent and all expenses, inclusive of interest of capital; but that arose, not from a deficiency of crop, but from the ruinous harvest which so seriously damaged all corn crops in the south of England that year. For crop 1849 a very profitable return is expected.

Neither of Mr. Huxtable's farms, as will be observed from our description, enjoys any advantage of soil or climate. The Hill Farm is in both respects inferior to the average of the arable farms of this county. We have thought it necessary to enter into these particulars, in order to satisfy the public that Mr. Huxtable is no mere theorist, and we strongly advise such as disagree from his conclusions to visit his farm before they condemn them as impossible. They may there acquire a knowledge of important facts in their business, elicited by a truly philosophic mind, guided by quick perception of detail and energetic action, and applied to the good purpose of increasing the food of the people and enlarging the field for their employment.

The condition of the Dorsetshire labourer has been so often exposed in the *Times*, that it would be a work of supererogation on our part to advert in more than a very passing manner to that subject. We found among the large farmers a great anxiety to vindicate themselves from the imputation of underpaying and unfairly treating the people under them. Several of them produced their labour-books in order to exonerate themselves from

blame, and they all complained loudly that exceptional cases had been described as applicable to the whole of Dorset, and that they had been held up to the public and were believed by it to be heartless grinders of the poor. The statements made by them were to the effect that they gave their labourers 8s. a-week, a piece of potato ground, fuel, beer in harvest time, with extra wages, and sometimes for their carters, shepherds, and other principal servants, a house. The fuel supplied is brushwood and turf, which each labourer prepares for use himself, but which the farmer carries home for him. The allowance of beer is a gallon daily for each man, and that enormous quantity is usually consumed in the following manner:—A quart to breakfast at 10 o'clock, a pint at half past 11 o'clock for luncheon, a quart during dinner between 1 and 2 o'clock, a pint at 4 o'clock, with something to eat, or, as it is called, a "nammuck," at 5 o'clock, and the rest when the work is finished. These details were given to us as a triumphant refutation of the charge that the Dorsetshire labourer is generally ill-used by his employer. We were further informed that the consumption of beer on a large farm involves in the year an expense of from £70 to £80 for malt. The supply commences with the hay-harvest, and ends when the corn crop is secured. We were not able to ascertain that any pernicious consequences to the health follow from this practice, which is the same as that already described in Devonshire, with the exception that there cider is used. A Devonshire cider cellar is little inferior in dimensions to a vault in the docks, and in one of them we saw no less than 150 hogs-heads collected, about one-half of which were destined for the consumption of the farm. The labour-books exhibited to us certainly went to show that on the large holdings the principal labourers received the wages and perquisites above mentioned, but how far these are given to all employed we are unable confidently to state. Women are paid 6d. a-day, and boys from half-a-crown to 3s. 6d. a-week. A compulsory sale of "gristings," or tail-wheat, to their people was strenuously denied by the farmers we visited; but, although this may be perfectly correct with regard to them individually, we have reason to believe that this practice still exists to a great extent in Dorsetshire, and that the small and poor tenants especially resort to it extensively. Among this last class the wages given at present are as low as 7s., and even 6s. a-week; yet, with this miserable pittance to live upon, there is said to be no more distress among the labourers than for years they have been obliged to bear. We were informed that they appreciate fully the advantages resulting from the low price of provisions. A clothing club has been established in the district of the county round Blandford, to which the labourers and their employers contribute equally, the subscription being 1d. per week for each member of a family, and the fund thus formed being applied to the purchase of clothes, which are made at the labourers' homes. For instance, a labourer with two children subscribes 3d. per week, to be paid monthly; his master pays an equal sum; and at the end of the year the labourer gets clothing for his family to the amount subscribed by

both, and of such a description as he chooses to select. In this manner £3,000 are said to be collected annually.

We close our survey of Dorsetshire by stating how far among the more intelligent farmers visited by us we heard opinions stated calculated to explain or meet the distress from which they are at present suffering. In this district they do not yet appear to have relinquished the hope of a return to protection. We were not able to discover any traces of a movement to adjust the system of farming pursued in this county to the altered circumstances of the times; the only change made being in the way of retrenchment, and, consequently, tending to diminish that high cultivation of the soil which is now indispensable to profitable farming on these thin chalky uplands. In our last communication we pointed out some of the modes in which a reduction of expense had already been effected. We have now to add, that the opinions expressed to us seem to indicate a further saving of outlay by lowering the wages of labour. From that lowering of wages discontent and turbulence are expected to arise, but beyond this point the anticipations of the Dorsetshire farmers do not as yet appear to extend. The large tenants appear less dissatisfied with their landlords, and less disposed to raise from the present distress a question of rent, than we have found to be the case in other parts of the country. Compensation for unexhausted improvements, the readjustment of the burdens on land, produce rents, security of tenure, and the various other subjects to which we have found the attention of agriculturists elsewhere so closely directed, do not seem to be very prominently discussed in this county. Yet it must not be supposed that the farmers of Dorset are not suffering from the prevailing distress: on that score they complain bitterly and loudly, and, if these complaints are well founded, the inference seems to be that, in the present depressed state of agriculture, men with large holdings of thin land cheaply worked with a corresponding rent, and men with smaller farms, the soil of which is good and the outlay and rent proportionally high, are equally exposed to the adverse influences of the markets.

(To be continued.)

THE OSAGE ORANGE FOR HEDGES.—Mr. M. Saul, of Garstang, has received the following from a correspondent at Port Hope, Columbia, Co. Wisconsin, United States:—"I am obliged for your directing my attention to the Ohio Cultivator: in No. 2 there are full directions for obtaining and sowing the seed of the Osage orange for hedges, which is found well calculated for that purpose. In No. 4 there is an engraving given, with full directions for planting and cutting. They make a complete fence in four years from the sowing of the seed, as they make shoots of four feet in one season. This is a most important discovery to agriculturists: the seed is obtained at Texas, and sold at one dollar per quart, and the one-year-old plants at five dollars per thousand." Mr. Saul writes as follows:—"Sir,—By allowing the above to appear in your columns, it may induce some of our agriculturists obtaining either the seeds or plants from America, and give it a trial in England. Our thorn hedges almost require a man's life-time in raising; whereas, if this Osage orange plant would answer in England as well as in America, it would be of the greatest importance in our agricultural improvements."

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

PROFESSOR WAY, Consulting-Chemist to the Society, delivered a lecture before the members, at their House in Hanover-square, on Wednesday, the 19th June, "On Variations in the Chemical Composition of Water, as affecting its Agricultural Uses," his Grace the Duke of Richmond, K.G., Trustee, being in the chair. Among the members present were, the Earls of Lonsdale and Chichester, Lord Bridport, Hon. R. H. Clive, M.P., Sir Thomas Dyke Acland, Bart., M.P., Sir M. W. Ridley, Bart., Sir Charles Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Montague Cholmeley, Bart., Mr. Barugh Almack, Mr. Raymond Barker, Mr. Burke, Mr. Decimus Burton, Dr. Calvert, Mr. Carden, Rev. Thomas Cator, Mr. W. G. Cavendish, M.P., Colonel Challoner, Mr. W. Clavering, Mr. Capel Cure, Mr. S. Druce, Mr. Dunne, Mr. Dyer, Mr. Fielden, Mr. Fuller, M.P., Mr. Brandreth Gibbs, Mr. Harding, Mr. Fisher Hobbs, Colonel MacDonall, Mr. Marshall, M.P., Mr. Maw, Mr. C. E. Overman, Mr. Parkins, Mr. Pendarves, M.P., Mr. Puller, Mr. Pusey, M.P., Mr. Thomas Rowlandson, Prof. Sewell, Mr. Shaw (London), Mr. Sillifant, Prof. Simonds, Mr. Slaney, M.P., Mr. Augustus Smith, Mr. Wilson (Stowlangtoft), and Mr. Wrightson.

LECTURE ON WATER.

Professor Way commenced his lecture by stating, that he intended on that occasion to call the attention of the members to three important heads of inquiry connected with water; more with a view to elicit from them practical illustrations founded on their individual experience, than to offer to them anything particularly novel or established. These heads of inquiry were the following: namely—1. On Water for Steam and other Boilers: the means of ascertaining its comparative suitability for that purpose, and of counteracting its tendency to incrustation. 2. On Water for Irrigation: its chemical impregnation, and the theory of its action. 3. On the influence of Water, obtained under different circumstances, on the health of Cattle, Horses, and other live stock on a farm. He remarked, that as the first head of inquiry related to the mechanical and chemical agency of inert matter, its details came within the range of analytical investigation, and he would be enabled to speak with much confidence on the facts he had to bring together under it; but as the other two heads included a reference to local circumstances, and to the influence of the vital operations of vegetation and animal physiology respectively, in the production of results, what he had to say on these points would be much less decisive, and advanced more for the purpose of seeking than for giving information.

1. Water for Steam Boilers.—The water from the clouds reached the earth almost pure in a chemical sense, as a homogeneous liquid, composed of the ele-

ments oxygen and hydrogen. It was distilled from the sea and land, and from the leaves of vegetables in a state of purity, and formed clouds; from which it again fell at intervals to the earth through the atmosphere, bringing with it only very minute traces, varying according to circumstances, and frequently inappreciable by the chemist, of carbonic acid gas, ammonia, nitric acid, and the effluvia arising from animal perspiration and the decomposition of animal matter. On reaching the land, however, its solvent power immediately came into operation, and it became impregnated more or less with the soluble substances with which it came in contact; common salt and gypsum were always dissolved by it, while lime and other substances were taken up by it when there happened to be an excess of carbonic acid gas present. In order to illustrate this fact, the Professor exhibited to the members a simple and striking experiment. Three glass vessels were connected together by means of bent glass tubes; the first vessel contained fragments of marble (as a pure variety of native carbonate of lime); the second, distilled water; and the third and last, a clear solution of quick-lime in pure water (or lime-water). On adding dilute muriatic acid gradually to the marble in the first vessel, carbonic acid gas was disengaged in great abundance, which, passing along the tubing into the middle vessel, was there washed and freed from impurity by its passage through the distilled water, and then proceeded, by means of a connecting glass tube, to the lower part of the inner surface, where it continued to bubble throughout the clear lime-water. After a few moments the lime-water became turbid. The Professor remarked that this effect resulted from the conversion of the lime into insoluble carbonate of lime (or chalk), by its combination with a first proportion of the carbonic acid gas passed through it. In a few moments afterwards, however, the liquid regained its original transparent appearance. This change, he explained, arose from the further supply of the same acid gas, constituting the insoluble carbonate of lime a soluble super-carbonate of that earth; the liquid, in fact, being then a solution, not of lime in water, as it was originally, but a solution of bi-carbonate of lime, or of chalk rendered soluble by excess of carbonic acid. To prove that this was the case, the Professor took the flask containing this solution, and having placed it over a spirit-lamp, caused ebullition to take place. After boiling for a short time, the liquid again became turbid, from the circumstance of the heat expelling the excess of carbonic acid, and again reducing the carbonate of lime to the state of insoluble chalk. He then proceeded to show how this experiment illustrated the change which was found to take place in the waters of limestone districts, which were naturally charged with carbonate as well as the sulphate of lime; and also how it imp-

pened that, while water, rendered hard by sulphate of lime only, did no injury to steam-boilers, as that salt was not deposited on raising the water to a boiling temperature; hard water, on the contrary, holding a large amount of carbonate of lime dissolved in it by carbonic acid, did the greatest injury to them, by gradually depositing, on being boiled, such carbonate of lime at the bottom of the steam-boilers, until it amounted to a hard calcareous incrustation. Water was always rendered hard by holding in solution either the carbonate or the sulphate of lime; and, accordingly, when obtained from wells in the chalk, oolitic, and limestone districts throughout the kingdom, was always hard; becoming turbid when boiled, and depositing its carbonate of lime on that part of the internal surface of the boiler nearest to the fire. As a familiar instance, he named the fur or crust in tea-kettles, in districts where such water was used; but in the case of steam-boilers, this deposit was one of the greatest evils that could be imagined; the hard calcareous incrustation in immediate contact with the iron plating of the boiler, amounting in a few weeks to no less than from two to three inches in thickness. Prof. Way explained how the injury arose in this case; namely, from the effect which the adhering crust had in preventing the transmission of the heat, received by the boiler from the fire, to the body of water within the boiler. He cited many curious instances of the cooling effect of this free transmission of heat on substances under other circumstances most fragile and combustible; and the contrary effect when the transmission of such heat was obstructed, as in the case of calcareous incrustation, when the heat was arrested by the solid slow-conducting body, and the temperature raised above that of boiling water. He stated that however odd it might sound to make the statement, it was no less true, that water might be boiled in an orange-peel, in an egg-shell, or in a vessel made of thin wood, or even of common writing-paper; the heat applied to the external surface being rapidly transmitted to the water, and the heat carried off in the steam generated, while the material employed for the boiler suffered no injurious effect from such application of heat. He related a singular instance of this kind, in the case of a person at Liverpool, who had frequently had his cotton-mill burnt down. The party in question imagined, that if he had a large reservoir for water placed at the top of his factory, constructed of wood instead of metal, the wood, in case of fire, would be immediately burnt to ashes, and the water would consequently be set at liberty and extinguish the fire. The fire unfortunately did break out again, as it was feared it would, but the wood, instead of being charred or burnt, remained entire, and, being encircled by the flames, the water continued to boil in its wooden reservoir as long as any remained in it. The furring of a boiler preventing this transmission of heat, and thus causing injury to the substance of the boiler, was the reason why, in some districts, where the water was charged with bi-carbonate of lime, the boilers were found to wear out sooner than in others; and why the railway companies had been led either to seek for soft water or to soften the hard water they had been in the habit of using, by the addition of some substance that would prevent its furring their boilers. The London and South-western Railway Company had used the substance known in commerce as sal-ammoniac with great success, by dissolving one ounce of it in 90 gallons of water, in tanks kept specially for the purpose. This substance was the neutral salt so long familiar to chemists as the muriate of ammonia, being a compound of muriatic acid and ammonia. Its action in removing the hardness of water arising from bi-carbonate of lime was explained by Professor Way in the following manner: When muriate of ammonia and carbonate of lime

are brought together in solution, a double decomposition ensues, each of the four combining substances changes its relative position, and two new salts are the result, namely, carbonate of ammonia, which is volatile, and accordingly makes its escape into the atmosphere; and muriate of lime, one of the most deliquescent salts with which chemists are acquainted, and which consequently remains in the water in a state of complete and almost permanent solubility. It might, he remarked, be said, that the ammonia of the sal-ammoniac carried off the carbonic acid, while the muriatic acid dissolved the lime, thus liberating the water from the chemical conditions under which its hardness was occasioned. Professor Clark, of the University of Aberdeen, had, however, proposed a plan for softening water rendered hard by carbonate of lime, which Professor Way considered much better than the one just described, and which might be adapted to the uses of agriculturists. This plan consisted in adding to such water a certain quantity of quicklime, which would unite with the excess of carbonic acid, and become converted into carbonate of lime, at the same time that it would reduce by such abstraction the super-carbonate also to a state of carbonate, and both being insoluble, they would, of course, fall as precipitates to the bottom of the vessel, or other enclosure in which the water was contained, leaving the water entirely free from the bi-carbonate of lime to which its hardness had in a great measure been owing. He then proceeded to describe Professor Clark's system of soap-tests, for ascertaining the relative degrees of hardness possessed by certain waters. He remarked that hard water, as was well known, curdled soap, which would not produce a lather until such hardness had been overcome. Professor Clark had recommended a solution of white curd-soap in spirit of wine of a certain strength to be employed in his testing. This solution would at once produce a lather with soft water, but not with hard water until a certain quantity of the solution had been added to it for the purpose of counter-acting the hardness: when lather of a proper firmness had been gained, the amount of standard solution employed to produce the effect indicated the degrees of hardness of any particular water; thus a standard of comparison was established, by which the choice as to different sources from which it would be most advantageous to procure water could be satisfactorily determined. Prof. Way then performed an experiment with this soap-test, on spring-water from the chalk at Croydon, in comparison with water from the Thames; the former indicating a hardness of about 18°, and the latter of about 15°. The operation consisted simply in adding to the water, from a graduated pipette or suction tube, successive measures of the solution, until the water when shaken up maintained a lather on its surface for five minutes. The number of measures then indicated the quality of the water, two soap measures being equal to about one degree of hardness. The process, he described, as easy, exact, and simple; and one which might be practised by any gentleman who was interested in such subjects, without spoiling either his furniture or carpets. It would also indicate the hardness resulting from the presence of sulphate of lime, as well as that from the bi-carbonate; though, as he had previously remarked, water hardened by sulphate of lime offered no objection for use in steam-boilers, as the sulphate by boiling did not become deposited, as was the case with the carbonate; in an economical and domestic sense, however, water rendered hard by either of these salts of lime was objectionable. Prof. Way then observed, that Prof. Clark, in recommending quick-lime to soften water containing the bi-carbonate, advised such quantities of lime to be added as a preliminary trial by the soap-test process should indicate as being requisite. Such water would, by this pro-

ness, be rendered soft for domestic purposes, and for steam and other boilers. The only difficulty consisted in tanks being required for the due subsidence of the chalk thus brought into an insoluble state in the water; but that was an obstacle which would no doubt be surmounted, for when it was considered how great the benefit of this plan would be found, not only in ordinary families, but in union-houses and prisons; that it was estimated that in London alone £600,000 every year was expended in the purchase of soap, one-half of which was wasted in the hardness of the water; and how important a point it was in the processes of bleaching, dyeing, and other staple manufactures carried on at Bolton, Manchester, Bradford, and other places, to have a soft water in which lime was absent, it would, he thought, be well worth the while of all parties interested in so important a question to make arrangements for the depositing tanks required. The Professor concluded this part of his subject by offering suggestions as to the means by which soft water might perhaps be artificially obtained on a large scale and at little cost where it did not occur naturally; and he especially referred to a proposed plan by which rain-water for economical purposes would hereafter probably be collected, in large quantities and at a cheap rate, as it fell from the clouds on large areas prepared to receive it. He remarked that water was found by experience to become softened by passing through the soil; water only, however, that was rendered hard by the bi-carbonate of lime. Thames water filtered through clay made permeable by the admixture of sand was found to become as soft as by Prof. Clark's process. Drainage water through regularly permeable stiff soils was more suitable for steam-engines than spring water. But whether water thrown over the land would by that means become soft, he was not prepared to say.

II. *Water for irrigation.*—Professor Way remarked that, for the purpose of irrigating, he thought that water should be hard, and not soft as for other purposes: that it should contain the sulphates and carbonates of potash, soda, and magnesia, including organic matter, as all these were substances that would be taken up and retained by the land. If this view of the subject were the correct one, it would follow that the water in granite districts would, from its softer nature, not be so useful in irrigation as that in other districts where lime and other earthy substances were dissolved by the water passing through them. On a former occasion Sir John Johnstone had named to the Council the failure of some irrigation of his from the supposed circumstance of the absence of mineral and earthy matter in the water, from the water being in fact too pure for the purpose. Sir John Johnstone being thus appealed to, replied, that, in the water to which Professor Way had alluded, there was no trace of lime whatever. The irrigation had been laid out by the late Dr. W. Smith on a thin moorland sandstone rock, in which there was no lime. Professor Way then proceeded to say, that, in Derbyshire, and at Bala Lake, in Wales, the water was exceedingly soft and pure, but considered as unfit for irrigation. He felt no doubt that irrigation would become much more general than it had been; and the subject was more interesting at the present time on account of the Society's ensuing country meeting being about to be held in Devonshire, where irrigating operations had been so successfully carried out. He should, on that occasion, select specimens of the different waters, under different circumstances, for the purpose of analysis, in order that he might report, as requested by the chemical committee of the Society, the result of his inquiries on that interesting branch of his researches. It had been found, by ascertaining from analysis the nutriment required by the Hop-plant, that only those soils that contained phosphate of lime and potash, would be suitable for the cul-

tivation of that plant namely such soils as those on the green sandstone of Sussex, Kent, and Surrey; and that what theory had thus prescribed as the condition, practice had actually proved to be the most advantageous in fact, the cultivation of Hops having been most successfully carried out on the soils in question. He thought it would also be found, analogically, that successful irrigation would probably be found to be confined to certain districts; namely, to the limestone principally. He thought it might be a question how far the influence of that operation was due to the temperature of the water, or to its chemical composition, or to both; he himself considered the chemical nature of the water to be the most essential; at the same time, he was free to confess, that they had all to learn upon this subject, and he trusted that an inspection of the Devonshire meadows would lead to further inquiries on the important questions connected with it.

III. *Water for Cattle.*—The Professor commenced this third head of his lecture by remarking that he believed it was a generally observed fact, that cattle liked the water of ponds, while they disliked that of limestone springs; that they preferred to quench their thirst in a green offensive collection of stagnant water, rather than in a running spring. In Bedfordshire he had seen cattle much relish a bad water filled with confervæ and animalcula; which, however, was the only water to which they happened to have access. Farmers generally supposed that the cattle were fond of such water, on account of the green vegetable matter it contained; and a distinguished professor had explained the fact by supposing such water to be "meat and drink" for the cattle. It was certain they did not like hard water; and it gave a staring coat to horses when they were obliged to drink it; and when it was considered that water in chalk districts contained from 60 to 70 grains of carbonate of lime in the gallon, while London water (which was hard compared with others) contained only from 15 to 16 grains, it would be obvious how much difference would be found to exist in different waters. He regarded a good supply of water essential to health; and thought it a point of great importance to ascertain the kinds of water most suitable to the animal economy under different local circumstances. Professor Way concluded his lecture by expressing a hope that the members present would communicate to the meeting such cases of the practical effects of hard water on the health of cattle, as it had been his object, in the remarks he had then made, to elicit from them.

DISCUSSION.

A Water-meadow is the triumph of agricultural art, changing as it does the very seasons; but though our rustic forefathers so long since mastered the result, the mode of the water's action has been left a mystery.

MR. PUSEY, *Journal* x., 462.

Sir John Johnstone inquired of Prof. Sewell what results on the subject of water for cattle had become known to him at the Royal Veterinary College.—Prof. Sewell believed that cattle generally preferred soft to hard water, and would drink from ponds and ditches rather than from springs. He thought the temperature had something to do with it, for he knew a brewer who had 100 horses, and who for 30 years had allowed them, whenever at home from work, to drink as much as they pleased of the New River water kept at a blood-heat; in consequence of which the animals were maintained in perfect health and strength, having no spasmodic affections of the bowels, no chills, no staring coats.—Col. Challoner had remarked that horses and cows preferred a pond into which dung water had run.—The Earl of Chichester had observed the same preference given for such water by cattle, but not to the same extent by sheep.—Dr. Cal-

vert had noticed that oxen preferred water in troughs to that in the clearest springs.—The Duke of Richmond remarked that water given to race-horses in the stable had always the chill taken off it.—Sir John Johnstone, in reverting to the subject of hardness, referred to the softening of water by boiling, as in the well-known case of water for tea, and inquired whether the whole of the 15 or 16 degrees of hardness occasioned by the carbonate of lime was removed by that action?—Prof. Way stated that the deposition of the carbonate of lime did not take place at once on the application of heat. Prof. Clark considered $1\frac{1}{2}$ or $2\frac{1}{2}$ hours' boiling to be required to effect that object.—The Rev. T. Cator referred to the use of soda in softening water, which Prof. Way observed was adopted on account of its being cheaper than soap.—Mr. Raymond Barker alluded to the effect of toasted bread in softening water. He had a few days ago an opportunity of witnessing a confirmation of what had been stated of the predilection of cattle for impure water, by seeing them turn away from fresh water drawn for them out of a well, and seek the mud-water collected in little pools in the meadow where they were pastured. He believed that cattle were generally indisposed to drink hard pure water.—Mr. Pusey, M.P., then favoured the meeting with his views on the action of water in connection with the beneficial effects attending the irrigation of land. He doubted whether, in the present state of our knowledge, it could be admitted as a general axiom that hard water was good for irrigation, and soft water, on the contrary, prejudicial. In Devonshire, the criterion by which practical workers in water-meadows were guided in their judgment of the quality of the water most suitable for their operations, was that of a certain warm, soft, and oily sensation it communicated to the touch, when a portion of it was held and examined in the palm of the hand; the absence of such a quality indicating, in their opinion, a water unsuitable for irrigation. He knew, as a fact, that when lime existed in any water in such excess as to give to it petrifying properties, such water was considered by practical men as decidedly unfit for irrigating purposes. He accordingly much doubted whether hard water was the only water fit for irrigation. He trusted that water-meadows would not be confined to the lime-stone districts; for in those geological districts of the west of England, where irrigation had been so long and successfully practised, lime was absent, and had therefore to be brought on the land from other districts, as required for the purposes of cultivation; the water being in consequence naturally soft. He considered that water in general became softened by remaining some time in ponds. In the hilly districts of Devonshire, the water of the small streams running down the declivities was found to improve in its irrigating qualities by such resting. Again: it had been found that water running over peaty land was prejudicial to it; but that the same water filtering through such land into the drains was advantageous to it, probably from carrying off the peaty matter; and by such percolation it became soft, and adapted for irrigation. He simply wished to express an opinion formed on the facts which had from time to time come before him on this subject, that it would, in the present state of their knowledge, be unsafe to assume the exclusive use of hard water in irrigation as an essential condition. In his paper on the Devonshire water-meadows, in the Society's Journal, he had only mentioned the prevailing opinion in that part of the country on this subject; he thought they were still ignorant on many important points in connection with the theory and practice of irrigation, and he trusted that the practical inspection of the Catch and Water-meadows of Sir Thomas Acland and Mr. George Turner, at the Exeter Meeting, and the chemical analyses of the waters to be made by Prof.

Way, would tend to a more exact acquaintance with the principles and conditions of irrigation.—The Rev. Thos. Cator considered that the soil itself had much to do with the results of irrigation.—Mr. Almack fully agreed with the opinions expressed both by Mr. Pusey and Prof. Way. He thought that time would prove each of them to be correct in his views, when the particular conditions of each case were duly limited by further experience. He considered snow as the best exemplification of the beneficial action of water containing ammonia, and possessing chemical qualities from other impregnation, in addition to the influence exerted by its peculiar mechanical structure.—Mr. Fisher Hobbs was glad to find from Prof. Way that this subject, of the economical employment of water, was to be pursued by him still further, especially in reference to points connected with agricultural operations. He did not think that animals generally preferred muddy to clear marly water from clean wells, although they might prefer it, after it had been drawn and stood some time, to the same water in its cold fresh state as obtained immediately from the well. The cattle on one of his farms had so great a predilection for the drainage water from sand and gravel, that he was obliged to fence off the mouth of the drain whence the water issued in order to restrain them. He thought farmers ought not to allow the runnings from their farm-yards to get into their ponds. He could fully confirm the views of Mr. Pusey. A curious circumstance had come within his observation in reference to drainage water. He had cut a drain in his land one furlong in length and from eight to twelve feet in depth through sand and gravel, and veins of clay, and which yielded three gallons of drainage-water per minute. When the hot weather set in, a most obnoxious odour proceeded from this drain, and there was found, on examination, an accumulation of several cart-loads of a congealed gelatinous-looking substance, of an ochreous colour, and in substance resembling fresh animal liver. On revisiting the place, a fortnight ago, the whole mass of corruption had vanished, and only a few insects were to be found in its place.—Mr. Rowlandson made some observations on the soap-test process of Professor Clark. He thought it a very simple and useful test for the hardness of water in all cases, excepting when (as in the water of the Dolomitic districts) the bi-carbonate of magnesia was present; whenever the hardness arose from magnesia he believed the soap-test would fail to indicate its degree, or rather, it would give a false indication of its amount; which might mislead, unless other tests were conjoined with the soap-test, for the purpose of guarding against this occurrence.—Professor Way was aware that Professor Clark's test applied only to certain waters; it was useful from its generally applicable and simple mode of employment: at the same time, he agreed with Mr. Rowlandson that, in cases where magnesia was suspected, it would be desirable to employ a collateral test, although the indication of hardness given by the soap-test with magnesian waters would at once, by its unusual amount, show the disturbance occasioned by the presence of some other salt than those of carbonate and sulphate of lime. With regard to the questions affecting the action of water in irrigation, he had only to repeat his diffidence on the subject, although he thought the criterion of hardness by which the Devonshire makers of water-meadows were guided might be fallacious, and that hard water might produce a soft, oily feeling to the hand as well as soft water. He had himself formed the opinion that the effects resulting from irrigation were due more to the chemical qualities of the water than to the circumstance of its higher or lower temperature; but he was sensible how ignorant we were on these difficult questions, and he should be most open to conviction, and glad to learn all that he could on the interesting subjects to which

he had then had the pleasure of calling the attention of the members.

On the motion of the Earl of Chichester, seconded by the Earl of Lonsdale, the best thanks of the meeting were then voted to Professor Way for his kindness in delivering before the members so interesting a lecture on that occasion.

A WEEKLY COUNCIL was held on Wednesday, the 26th of June; present—the Hon. Robert Henry Clive, M.P., Trustee, in the Chair; Earl of Lonsdale, Earl of Chichester, Lord Lovaine, Sir Thos. Dyke Acland, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Sir Montague Cholmeley, Bart., Sir Robert Price, Bart., M.P., Sir E. M. Elton, Bart., Mr. T. Raymond Barker, Mr. John R. Barker, Dr. Calvert, Col. Chaloner, Mr. Fuller, M.P., Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. D. Lewis, Mr. Miles, M.P., Col. Morris, Mr. C. E. Overman, Mr. Parkins, Mr. Pendarves, M.P., Mr. Thos. Rowlandson, Prof. Sewell, Mr. Shaw (London), Mr. Shelley, Prof. Simonds, Mr. Towneley, Prof. Way, and Mr. Wilson of Stowlangtoft.

Anglo-Merino Wool.—Mr. Rowlandson read to the Council a correspondence he had recently carried on with Mr. Leyland Woods, on the subject of Anglo-Merino Wool for the purposes of dyeing; and submitted to the Members a sample of that Wool. He stated that it retained all the fineness of the old Southdown with a longer staple, which was susceptible of improvement from carding and fine combing, and was sought after for the manufacture of cachmere and other shawls. Its quality was good, but its colour dirty, an unfavourable circumstance, which prevented the wool from taking that brilliant dye assumed by foreign wools. The great object of his bringing this subject before the Council was, to inquire whether the bad colour of this wool might not be obviated or removed by judicious management of some kind. Unfortunately, the close quality of the Southdown wool did not admit of that perfect washing to which the more open-fleeced wools could be subjected. The sample he exhibited possessed firmness and staple, and would fetch a high price in the market; and it would compete with the finest foreign wools, if by any means it could be properly cleansed for the dyer. An interesting conversation then ensued between the Earl of Chichester, Mr. Shelley, The Hon. Mr. Clive, and Mr. Overman, on the circumstances connected with the growth of this wool, the character and age of the sheep from which it had been obtained, the management of the wool, and its market price compared with other wools.—Mr. Fisher Hobbs agreed with Mr. Rowlandson on the importance of preparing this wool by such detergent means as would increase its quality for the dyer, and its market value as an article for the manufacturer.—Mr. Rowlandson remarked that the fineness of staple of this wool was adapted only for the finer class of goods, which were less in demand; it had every quality for that purpose, excepting purity of colour; and he feared the stain or discoloration, on account of which it thus failed in being perfect, was indelible, and arose from natural causes, not from accidental circumstances.—Mr. Raymond Barker thought that the colour of wool was much influenced by the soil on which the sheep were kept.—Mr. Overman suspected that the application of spirits of tar was the frequent cause of the stains which were the subject of complaint.—Mr. Fisher Hobbs had never found any difficulty in cleansing his wool by washing it twice with soft soap and once with water. He thought it very desirable that some arrangement should be made by the woolstaplers and flockmasters, by which more induce-

ment might be offered for the production of superior wools.

Turnip-Fly.—Lieut. Brown, R.N., exhibited to the Council his first attempt at adapting his Horticultural Fumigator to agricultural purposes. That little instrument had long been known to horticulturists as a simple, effectual, and portable means, by which volumes of tobacco or other fumes could be thrown in a cool and dense mass on shrubs and flowers, without injury to the most delicate plant; or, by which green-houses, stoves, frames, apiaries, houses, ships, or other enclosed spaces, might be fumigated in the most direct and precise manner. The successful employment of that instrument for those purposes had led Lieut. Brown (who had for many years in earlier life been extensively engaged in practical farming) to attempt its adaptation to field uses, especially to destroy or paralyze the ravages of the turnip-fly, by fumigating the crop with the empyreumatic smoke resulting from the slow burning of vegetable field refuse. This instrument was made for him by Messrs. Cottam and Hallen, and exhibited in action in the court-yard of the Society's house to the members. It consisted of a barrow-wheel and shaft-handles, supporting an iron-plate circular chamber, within which revolved (by means of a strap set in motion by such wheel) an axis with radiate fan-plates, at right angles to the plane of revolution of such axis. The chamber had two openings; one at the side, by which the smoke was drawn into it (through an upright cylinder, at the top of which was the combustion box) by the rapid revolution of the fans; and the other in front, by which the smoke was driven out through a pipe or nozzle, moving on a hollow ball-and-socket joint, and directed, like the same part of a garden-engine, on any object at pleasure. Mr. Brown was satisfied with the result of this first attempt, as far as it established, in his opinion, the application of his principle; but he was dissatisfied with it inasmuch as the mechanical adjustments for generating the fumes, and throwing them out in sufficient quantity, and with the requisite rapidity, were incomplete. He hoped, by the 10th of July, to produce a perfect engine for the inspection of the Council. In the meantime, he remarked that smoke of any kind was known to have the effect of paralyzing the fly, and arresting its ravages on the turnip crop, until the young plants could get into rough leaf, and out of danger. The only practical difficulty consisted in the mechanical means of applying it: this, he hoped, would be accomplished when the engine he had the honour to exhibit to the Members should be perfected. This barrow-fumigator was wheeled by one man within the drills, at the rate of three miles per hour: it could be set for any width or depth, and employed for any crop.

Cork Meeting.—Mr. Bullen, Secretary to the Royal Agricultural Improvement Society of Ireland, informed the Council that the country meeting of that Society would this year be held in the city of Cork, in the week succeeding the Exeter Meeting of the Royal Agricultural Society of England; and he invited the attendance of the members and exhibitors who attended the latter meeting to pass over into Ireland to the Cork Meeting, where a most cordial and grateful reception would be given to them, for such an instance of their sympathy and kind interest in the agriculture of the sister island, placed like that of England under the auspices of a kindred Royal Society.

At a MONTHLY COUNCIL held at the Society's House in Hanover-square, on Wednesday, the 3rd of July: present, the Marquis of Downshire, President, in the Chair; Lord Camoys, Lord Bridport, Lord Portman, Hon. R. H. Clive, M.P., Sir Matthew White Ridley,

Bart., Sir Charles Lemon, Bart., M.P., Sir Robert Price, Bart., Colonel Austen, Mr. Raymond Barker, Mr. C. Barnett, Mr. S. Bennett, Mr. Blanshard, Mr. Bramston, M.P., Mr. Brandreth, Mr. Burke, Mr. W. G. Cavendish, M.P., Colonel Challoner, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. S. Jonas, Mr. Kinder, Mr. Pendarves, M.P., Mr. Pusey, M.P., Prof. Sewell, Mr. Shaw, of London, Mr. Shelley, Prof. Simonds, Mr. W. Simpson, Mr. Stansfield, M.P., Mr. Turner, of Barton, Mr. Jonas Webb, and Prof. Way.

Finances.—Colonel Challoner, Chairman of the Finance Committee, presented to the Council the Monthly Report on the Accounts and Funds of the Society; from which it appeared, that on the last day of the month of June, then just ended, the current cash-balance in the hands of the Bankers was £2,435. He explained that this general balance included £660 on the Exeter Subscription Account, and £290 to be invested as life-compositions; leaving a balance of £1,485 available for current purposes. Colonel Challoner then proceeded to inform the Council that the cases of arrears in the County of Middlesex had been gone into, and where proceedings had been taken, the amounts claimed had either been paid into court, or at the office of the Society. In the case of one party, however, who resisted the claim in a court of law, the Society obtained the amount of their demand with full costs. He added, that as soon as the period of the approaching Exeter Meeting was over, the Finance Committee would be prepared to proceed in the same manner with defaulters in other counties. This Report was unanimously adopted by the Council.

Lecture-Room.—The Report of the House Committee having been read, the consideration of that part of it which had reference to a recommendation by the Committee that a lecture-room should be erected on the Society's premises, was deferred until the Committee were prepared to submit to the Council a working plan of the room proposed, and an estimate of its cost of erection.—The Marquis of Downshire then informed the Council that, as their President at that time, it gave him very great pleasure to testify his respect to the Members, and to evince his abiding interest in the welfare of the Society, by making a proposition to the Council which he hoped they would as readily accept, if it should be deemed advantageous to the prosecution of the worthy objects of the Society, as it was most readily and cheerfully offered on his part; namely, to avail themselves, as they should find it convenient, of the principal apartment in his family mansion in Hanover Square, where, by giving a day's notice to his servants, every accommodation would at once be made for any Lecture the Council might at any time decide upon as calculated to diffuse scientific and practical information on agricultural subjects.—On the motion of Lord Camoys, seconded by Mr. Shelley, this most considerate and handsome offer on the part of the Marquis of Downshire was unanimously accepted by the Council, with an expression of their grateful sense of the kindness which had prompted his Lordship to make it to them.

Agricultural Chemistry.—Mr. Pusey, M.P., in submitting to the Council the Report of the Chemical Committee, took that opportunity of expressing his satisfaction at the favourable progress made by Professor Way, in carrying out in his laboratory the various researches connected with important points of agricultural science and practice, recommended by the Committee and approved by the Council.

Veterinary Inspection.—Mr. Raymond Barker, Chairman of the Veterinary Committee, laid before the Council the Report of that Committee, along with the special reports made to them by Professor Simonds, the

Veterinary Inspector of the Society, on the case of cows in Somersetshire belonging to a tenant of Lord Portman's, and on the outbreak of pleuro-pneumonia among the stock of Mr. Capel Cure, in Essex. These reports were referred to the Journal Committee. Professor Simonds continued to regard pleuro-pneumonia as a purely non-inflammatory disease at its commencement.

Exeter Meeting.—Lord Portman transmitted to the Council the following report from the General Exeter Committee:—

1. The Committee have concluded contracts with Mr. Manning for the execution of the pavilion and show-yards, and for the hire of hurdles.
2. They have concluded a contract with M. Soyer, for the supply and furnishing of the pavilion dinner, at the average rate of the contract price at the former country meetings of the society.
3. They have chosen by lot the stewards of the tables in the pavilion.
4. They have referred the invitations to the high table to a committee, consisting of the president, the past president, and the president-elect.
5. They have made a preliminary arrangement for the toasts and speakers at the pavilion dinner.
6. They have received and published the secretary's final report, on his communication with the railway companies, on the subject of concessions in favour of the Society's Exhibitors at the Exeter Meeting.
7. They have made the usual application to Her Majesty's principal Secretary of State for the Home Department for metropolitan police.
8. They have made due arrangements for the various tickets and the official badges required at the Exeter Meeting.
9. They have completed and published the programme of proceedings for the occasion.

This report having been adopted by the Council, a report was received from Mr. Manning, the Society's contractor of works, on the near completion of all the arrangements connected with the erection of the Pavilion and Show-yards.—Mr. Brandreth Gibbs informed the Council that he should proceed to Exeter in a few days from that date, for the purpose of commencing his operations in the Show-yard, and that he should be prepared, as the Honorary Director of the Show, to receive and attend to any instructions the Council might think proper to transmit to him.

Judges.—Lord Portman, Chairman of the Judge's Committee, having transmitted to the Council the list of Judges recommended by them for the Exeter Meeting, in the different departments of Implements and Live Stock, the Council adopted that report, and made the appointment accordingly of the various parties proposed.

Sheep-Shearing.—On the motion of Mr. Shaw, of London, seconded by Mr. Jonas, the Council passed the following resolution:—

"That it be an instruction to the judges to see that, according to the terms of the certificate, the sheep exhibited at the country meetings of the society be fairly and properly shorn; and that the director of the show be requested to take measures that no shearing be allowed in the show-yard."

Leicester Sheep.—Mr. Pawlett, of Beeston, addressed a letter to the Council, entering into a detail of the "unfair practices that had been used at some of the shows of the society, and which he understood would be again attempted at the ensuing Exeter Meeting; a communication he made in the hope that the Council would order special instructions to be given to the Judges of Leicester Sheep, to examine the different animals shown in those classes, before awarding the prizes, in order to disqualify all those that were not produced agreeably with the printed conditions."

Agricultural Implements.—Colonel Challoner, Chair-

man of the Implement Committee, presented to the Council the Report of that Committee, from the various practical details of which connected with the Stewards' Department, the following two paragraphs may be selected for publication, on account of the general interest felt on the points to which they refer, namely:—

1. The Committee have the satisfaction of reporting to the Council, that the improvements made by Mr. Amos, the Consulting Engineer to the Society, in the apparatus for testing the power of machinery, will supersede the necessity of the Society's hiring or purchasing a steam-engine of their own for the trials at their Country Meeting.

2. The Committee recommend that the Judges, in their awards to implements under the head of "Miscellaneous," bear in mind the requirements of small farmers.

Colonel Challoner assured the Council that Mr. Amos's arrangements were now most perfect. It had been feared that the necessity of the Society's being put to the great expense and inconvenience of having their own Steam-engine for their trials of Agricultural Implements and Machinery would prove an imperative one: he, however, had not felt that fear so strongly as others had done: he knew the principle adopted for ascertaining what quantity of power each machine required to do a certain amount of work, to be a sound one; and he had full confidence that the zeal and mechanical science of Mr. Amos would ultimately triumph, as it had done, over every temporary obstacle.—Mr. Turner, of Barton, expressed the satisfaction he felt to find that attention was recommended to the wants of the small farmer, who required for the cultivation of his land only those implements that were simple in their construction and easy to be worked.—Colonel Challoner remarked, that being so well acquainted as he was with the County of Somerset, he well knew how much such implements as those recommended by the Committee, and referred to by Mr. Turner, were required by the small holders in the West of England; and he should never rest content with the results obtained by the Society until implements on the best principle, and for every purpose of cultivation under those circumstances, could be made at a moderate expense by any common blacksmith throughout the country.

The President laid before the Council a communication addressed to him by M. Célestin Chilliard, of Paris, on his mode of arresting the progress of the potato disease. Lord Rossmore conveyed the Council his high sense of the value of the Society's Journal. Mr. Nesbit, of Kennington, presented a copy of his chart of the principal Fossiliferous Deposits in the British Islands, prepared for the use of his pupils. Mr. Layton Cooke presented a copy of his "Referee and Guide to the Valuation of Real Property," dedicated by him to the Society. Mr. Henry Besley presented a copy of his "Hand Book to Exeter, and to the Exeter Meeting." The Council having ordered their usual thanks to the respective authors of these communications and presents, adjourned to the following Wednesday; and notice was given that, on the rising of that Meeting, they should adjourn (over the Special Councils to be held at the Guildhall in Exeter) to their Monthly Meeting in London, on Wednesday the 7th of August.

The following new members were elected:

Amos, Charles Edward, C.E., The Grove, Southwark
Birmingham, William, Thillerton, Broadclist, Devonshire
Bullock, George, East Coker, Somerset
Cutler, George Henry, Upton Lodge, Torbay, Devon
Dilleit, John, Petticombe, Torrington
Durant, Richard, Sharpam, Devon
Ffooks, Thomas, Sherborne, Dorset
Gard, Richard Sommers, Rougemont, Exeter
Hardy, John, junr., 3, Portland Place, London
Hurd, Thomas, 2, Blandford Square, London
Johnson, James, Chatterley Hall Farm, Tunstall, Staffs.
Lidstone, Roger, George-street, Plymouth
Miles, William, Dix's Field, Exeter
Morris, Colonel Lewis G. (Vice-President of the New York State Agricultural Society, and Chairman of the Board of Agriculture of the American Institute), Morrisania, near New York
Nunn, James Hardy, Pool-place, Great Yeldham, Essex
Roundell, Rev. Henry, Southernhay, Exeter
Snell, Benjamin, Wayton, Devonport
Snow, Thomas, Franklin, Exeter
Wythis, George, Reigate, Surrey.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.—ANNUAL COUNTRY MEETING.

ORIGIN OF THE SOCIETY.

The following account of the origin of the Society, from the *Norfolk News* of last year, compiled by Cuthbert W. Johnson, Esq., will be interesting to the agriculturists of the district in which the meeting of the Society has just been held.

For many years after the dissolution of the Board of Agriculture, there was not to be found in this country any national society which, in its objects and power, could be compared to the great and successful Highland Society of Scotland. The first person who steadily and successfully exerted himself to form such a society was Mr. William Shaw, of London—a gentleman to whom in this, as in many other great efforts, agriculture is deeply indebted. On many occasions, during 1834 and the succeeding years, in more than one agricultural periodical, he suggested and advocated the establishment of a national institution for the advancement of practical agriculture, and of practical agriculture only. He had also, to accomplish this object, several personal communications with the late Lord Spencer, the Duke of Richmond, Mr. Handley, and other great leading agriculturists;

and, in consequence of these efforts, at the dinner of the Smithfield Club, on the 11th of December, 1837, Lord Spencer, in his address to the Members of the Club, suggested the establishment of such a society—a suggestion which was warmly received by the meeting, and was immediately responded to by the Duke of Richmond, Mr. Handley, Mr. E. W. Wilmot, and, in fact, by the whole party.

Lord Spencer remarked (alluding to the Smithfield Club), "Our society in the metropolis is totally useless for the promotion of the general purposes of agriculture; but if a society were established for agricultural purposes exclusively, I hesitate not to say that it would be productive of the most essential benefits to the English farmer. There is one point, however, which I must impress upon you, in reference to the formation of a society such as I have mentioned, namely, that there can be no prospect of our obtaining any useful results, unless politics, and the discussion of all matters which might become subjects of legislative enactment, are scrupulously avoided at its meetings." The Duke of Richmond, at the same meeting, expressed as his opinion that "such an institution

would promote agriculture, and confer great and inestimable advantages on every class of the community." Mr. Handley, when observing that he had long contemplated the formation of such a society, very truly remarked that "there is not a single department of farming but what is capable of vast improvement."—*Fer. Mag.*, vol. viii., p. 48.

A short time after this discussion, there appeared a very excellent pamphlet from the late Mr. Handley, dated from Culverthorpe, in January, 1838, entitled "A Letter to Earl Spencer (President of the Smithfield Club) on the formation of a National Agricultural Institution." In the course of this, he very justly observed (and the answer to his concluding question can only be made in one way) "great attention and expense, spirited emulation, and well-directed experiments, grounded upon scientific principles, have succeeded in producing that near approach to perfection in breeding and feeding cattle, which was so remarkable at the late Christmas show. Why, then, should not the same combined efforts be united in the application of science to the sister art, agriculture, which your lordship has justly pronounced to be still in its infancy?"

The public impression of the value of such a society to the advancement of agriculture now became too general to fail of producing the expected results, and in the early part of the following month of March an advertisement appeared in the public papers, to the effect that several noblemen and gentlemen "having observed the great advantages which the cultivation of the soil in Scotland has derived from the establishment and exertions of the Highland Society, and thinking that the management of land in England and Wales, both in the cultivation of the soil and in the care of woods and plantations, is capable of great improvement by the exertions of a similar society, request that those who are inclined to concur with them in this opinion will meet them on Wednesday, the 9th of May, 1838, at the Freemasons' Tavern." To this was attached the signatures of the Dukes of Richmond and Wellington, the Earls Fitzwilliam, Spencer, Chichester, Ripon, and Stradbroke, Lord Portman, R. Clive, B. Portman, B. Baring, Sir James Graham, Sir F. Lawley, J. Bowes, E. Buller, R. A. Christopher, H. Blanchard, W. T. Copeland, J. W. Childers, R. Etwall, H. Handley, C. S. Lefevre, W. Long, W. Miles, J. Neeld, E. W. W. Pendarves, P. Pusey, E. A. Sandford, R. A. Slaney, J. A. Smith, R. G. Townley, W. Whitbread, and Henry Wilson.

In consequence of this address, on the 9th of May a very numerous and influential meeting was held, at which Earl Spencer presided; and at which, after some attempted interruption by one or two persons who did not exactly comprehend the objects of the proposed society, it was resolved, on the motion of the Duke of Richmond, seconded by Mr. Handley:—1. "That a society be established for the improvement of agriculture in England and Wales, and that it be called the 'English Agricultural Society.'" 2. On the motion of Sir Robert Peel, seconded by Mr. C. Shaw Lefevre, "That no question be discussed at its meetings of a political tendency." 3. On the motion of Sir James Graham, seconded by Mr. W.

T. Copeland, "That the society should consist of two classes, Governors and Members." 4. On the motion of Earl Fitzwilliam, seconded by Mr. P. Pusey, "That annual meetings be held successively in different parts of England and Wales." 5. On the motion of the Earl of Chichester, seconded by Mr. E. S. Cayley, "That a Committee be appointed to frame Rules and Regulations, and to report to a general meeting on the 27th of June." And it was finally agreed that all those who joined the Society before that day might become members of the Society; but that subsequently to that period, they should be elected by the Committee.

The list of those who by the 12th of May, or within three days of the Society's formation, were its members, is worthy of being preserved: it is a list which we have little doubt will long be a source of interest to the English farmer, for it contains the names of almost all those who, with Mr. Shaw, may be regarded as the founders of the Society.

LIST OF SUBSCRIBERS TO THE ENGLISH AGRICULTURAL SOCIETY, MAY 12, 1838.

Acland, Sir T., Bart.	Challoner, Col.
Adeane, H. J.	Chapman, T.
Alston, R.	Chapman, G.
Alston, R. G.	Chichester, Earl of
Amherst, Lord	Childers, J. W.
Angerstein, J. J.	Christopher, R. A.
Antrobus, Sir E., Bart.	Clay, W.
Arbuthnot, Right Hon. C.	Clive, Hon. R.
Archdeekne, E.	Cook, O.
Bagge, W., M.P.	Copeland, Alderman
Baker, J. W.	Cormack, W.
Barber, R.	Cormack, W. J.
Barclay, C.	Crompton, S.
Barclay D.	Cure, C.
Baring W. B.	Curteis, E. B.
Barker, G.	Curtis, W.
Barker, J. R.	Daere, Lord
Barker, T. R.	Davenport, E.
Barnard, R.	David, F., Esq.
Barneby, J.	Denison, W. J.
Beach, Sir M. H., Bart.	Dixon, R. W.
Bevell, J.	Downshire, Marquis of
Blachford O.	Drury, G.
Blake, —	Egerton, T. W.
Bland, W.	Eliot, Lord
Blanchard, H.	Ellman, J.
Bowes, J.	Ellman, T.
Boys, H.	Enys, J. S.
Boys, —	Essex, Earl of
Bouverie, E.	Etwall, R.
Bramston, T. W.	Euston, Earl
Braybroke, Lord	Evans, W.
Bridport, Lord	Exeter, Marquis of
Bromwell, Rev. R.	Fitzwilliam, Earl
Brookes, J.	Flight, T.
Bruges, W. H. L.	Flounders, B.
Budd, Capt. H.	Freeman, W. P.
Buller, E.	Gardner, Rev. C.
Buller, T. W.	Gibbon A.
Bunbury, Sir H., Bart.	Gibbs, H.
Burke, F.	Gidley C.
Burlington, Earl of	Gooch, Sir T., Bart.
Caldecote, R. M.	Goodrick, Sir F., Bart.
Calverley, T.	Gordon, —, M.P.
Cambridge, H.R.H. the	Goring, Mrs.
Duke of	Goring, C.
Capper, —	Gorringe, J. P.
Cavendish, Hon. C. C.	Gorringe, Mrs. J. P.
Cayley, Sir G., Bart.	Gowling, E.

Grace, Rev. H. T.
 Graham, Sir J., Bart.
 Grafton, the Duke of
 Graham, Rev. H. G.
 Grantham, S.
 Grey, W. H. C.
 Grimshaw, W.
 Hall, G. W.
 Halsted, T.
 Handley, H.
 Handley, W. F.
 Hatherton Lord
 Hayward, M.
 Heathcote, J.
 Heathcote, Sir W., Bart.
 Henage, E.
 Herbert, Hon. S.
 Hewer, J.
 Hewitt, Lieut.
 Hewitt, W. H.
 Hillyard, C., Esq.
 Hobbs, W. F.
 Hodges, T. L.
 Hodson, W.
 Hodson, —
 Holmes, W. S.
 Honey, Rev. J.
 Hoskins, K.
 Howick, Viscount
 Hulse, Sir C., Bart.
 Hurst, R. H.
 Hurst, —
 Ide, J.
 Ilchester, Lord
 Jodrell, Sir P., Bart.
 Johnson, Sir F., Bart.
 Johnson, Rev. Dr.
 Johnson, C. W.
 Kenyon, Lord
 Kerrison, Sir E., Bart.
 Kilson, Rev. H.
 Kimberley, W. G.
 King, Lord
 Knatchbull, Sir E., Bart.
 Knight, H. G.
 Lansdowne, Marquis of
 Lawley, Sir F., Bart.
 Lefevre, C. S.
 Lemon, Sir C.
 Ley, J. H.
 Livesey, T.
 Long, W.
 Lyon, J.
 Marshall, Capt. H.
 Marshall, W.
 Melbourne, Viscount
 Miles, P. J.
 Miles, W.
 Milne, A.
 Moore, Rev. H.
 Moreton, Lord
 Moreton, Hon. A.
 Morgan, Sir C., Bart.
 Morton, J.
 Morrison, J.
 Mount, W.
 Neute, H., St. John
 Neeld, J.
 Noakes, —
 North, F.
 Northumberland, Duke of
 Nurse, W.
 Ogle, H.
 Oliver, W.

Parden, —
 Palmer, R.
 Parkes, J. W. H.
 Patten, W.
 Patterson, W. S.
 Peel, Sir R., Bart.
 Pegus, Rev. W.
 Pell, Sir W. O.
 Pendarves, E. W.
 Peppercorn, H.
 Perry, G. W.
 Philips, J. Burton
 Phillips, Mark
 Phipps, Thomas Hele
 Pincock, Rev. J.
 Pinnock, Rev. H.
 Pittman, Rev. T.
 Platt, —
 Plestow, C. B.
 Portman, Lord
 Price, Sir R., Bart.
 Pusey, P.
 Radnor, Lord
 Ransome, J. A.
 Rawden, C. Wynd
 Rayleigh, Lord
 Richards, James
 Richmond, Duke of
 Ridgway, J.
 Ripon, Earl of
 Robinson, Rev. W. B.
 Rogerson, John
 Rogerson, Joseph
 Rushbridger, John
 Russell, Lord C.
 Sadler, Henry
 Salomons, David
 Sandford, E. A.
 Saunders, T. B.
 Satterfield, Joshua
 Shaw, Wm.
 Sheffield, Lord
 Sherborn, George
 Sheridan, R. B.
 Slaney, R. A.
 Smith, Jeremiah
 Smith, J. A.
 Smith, W.
 Smythies, Rev. J. R.
 Soudes, Lord
 Spencer, Captain
 Spencer Earl
 Stace, —
 Stanley, Lord
 Starr, —
 Stone, W.
 Stradbroke, Earl of
 Stafford, Dugdale
 Suffolk, Earl of
 Sumner, Col. H.
 Talbot, Earl of
 Tattersall, J.
 Thompson, P. B.
 Thompson, Rt. Hon. C. P.
 Tilden, John
 Townley, R. G.
 Trotter, John
 Vane, Rev. J.
 Verney, Sir H., Bart.
 Wall, B. C.
 Watson, Hon. R.
 Webb, William
 Webster, Lady
 Weeding, Thomas

Welby, Sir W., Bart.
 Welland, Charles
 Wellington, the Duke of
 Wensley, Rev. J. A.
 Whitear, Rev. J. A.
 Whitbread, W.
 Whitlaw, C.
 Whitting, J. H.
 Wilbraham, G.
 Wilkinson, Rev. F.

William, W.
 Wilmot, Sir E., Bart.
 Wilmott, E. W.
 Wills, B.
 Wilson, Henry
 Wingate, W. B.
 Wood, C.
 Wood, John
 Worsley, Lord
 Youatt, William.

Thus commenced the Royal Agricultural Society of England—an association which, in ten years only from its formation, has outstripped, both in power and in usefulness, not only the Highland Society of Scotland, and every other agricultural association in the United Kingdom, but bids fair to achieve still greater things hereafter, for the husbandry of Great Britain.

PREPARATIONS FOR HOLDING THE MEETING FOR 1850 IN EXETER.

[FROM THE EXETER FLYING POST.]

The Council of the Royal Agricultural Society having intimated in the early part of the year 1848 that the meeting for 1850 should be held in one of the south-western counties, and a letter to that effect having been forwarded to Dr. Shapter, then Mayor of Exeter, accompanied with certain queries which the Society required to be satisfactorily answered, that gentleman, after an interview with G. Turner, Esq., of Barton, decided on holding a public meeting in Exeter, and which took place on the 28th July, 1848, in the Guildhall of this city, and was attended by gentlemen belonging both to the city and county. At that meeting, the advantages resulting from the proceedings of the Royal Agricultural Society, in improving everything connected with farming pursuits, whereby the largest and best amount of farm produce could be obtained, was ably placed before the meeting by G. Turner, Esq., B. Fulford, Esq., J. Sillifant, Esq. (the then high sheriff for the county), and others. The benefit likely to result to the city from the great influx of visitors was also stated; and in that respect the statements of those who were the first movers in the matter have been fully realized. At that meeting a committee was appointed, consisting of many of the gentry and great agriculturists of the county, as well as the most respectable inhabitants of the city, to invite the Society to Exeter, and to set before the members of the Council the great advantages Devon possessed over the other counties comprised in the south-western district. At the same meeting, subscriptions amounting to upwards of £300 were immediately entered into towards defraying certain expenses, and which the Society required should be guaranteed before they made their selection. Amongst those whose names were then put down were Sir T. D. Acland, Bart., M.P., Sir J. Y. Buller, Bart., M.P., and L. W. Buck, Esq., M.P., for £50 each.

These preliminaries having been entered into, the committee set to work, and through the untiring exertions both of G. Turner, Esq., the treasurer, and C. Brutton, Esq., the secretary of the committee, the sum required was soon realized; sites for show-yards, &c., were inspected and duly reported, and everything put in a proper course to receive the committee of inspection. Accordingly, on the 18th April, 1849, the committee, consisting of R. Barker, Esq., H. Brandreth, Esq., W. F. Hobbs, Esq., W. Shaw, Esq., and R. Millward, Esq., visited this city, and, with the local committee, inspected the various localities, as well as made minute inquiries as to the fitness of certain spots which were deemed eligible for this truly national display of agricultural produce, and engineering skill connected with agri-

culture. The committee did not proceed further westward, but visited other towns to the eastward, and on their return to London they made a private report to the Council. On the second of May, 1849, the Council met, the attendance of members being very numerous, his Grace the Duke of Richmond in the chair. On this occasion, a deputation appointed by the Devon committee, consisting of the following gentlemen, waited on the Council:—C. Arden, Esq. (Mayor of Exeter); M. E. N. Parker, Esq. (High Sheriff of Devon); J. Sillifant, Esq. (Chairman of the general committee); Sir T. D. Acland, Bart., M.P.; Sir J. B. Y. Buller, Bart., M.P.; Sir J. Duckworth, Bart., M.P.; Sir R. Lopes, Bart., M.P.; Sir C. Lemon, Bart., M.P.; Sir R. L. Newman, Bart.; L. W. Buck, Esq., M.P.; E. Divett, Esq., M.P.; J. Heathcote, Esq., M.P.; J. W. Buller, Esq.; L. V. Palk, Esq.; Ed. Woolmer, Esq.; C. Brutton, Esq. (honorary secretary); and J. Gidley, Esq. (town clerk of Exeter)—and were received by them most courteously, and to all the enquiries made by the noble chairman of the deputation, the most satisfactory answers were given, and when the Duke concluded his category by asking if any one present was prepared to state a reason why the annual meeting for 1850 should be held at Exeter, Mr. Buck, the respected member for North Devon, observed, "It would be more difficult to state a reason why it should not"—a remark which was warmly applauded. J. Sillifant, Esq., then addressed the Council on the superior claims Exeter possessed over the other places in the South Western district for holding the show for 1850, when the deputation retired. They were shortly after recalled, and informed by the noble Duke that the Council had unanimously determined that the meeting for 1850 should be held at Exeter, in preference to Salisbury or Taunton. On the following Monday morning a meeting of the Exeter Town Council was held at the Guildhall, when the Mayor signed the necessary documents, which were handed over to C. Brutton, Esq., the honorary secretary of the local committee, who forwarded them to the Council, and the matter was then finally settled.

DECORATIONS OF THE CITY OF EXETER

Are on a par with the magnificence of the other arrangements. From almost every window and house-top may be seen waving flags of every description, from the magnificent silken standard of Southernhay, down to the cotton stocking hanging from the garret window of the west-end shop. Windows and doors are completely hidden beneath plants of all kinds. The town is a vast greenery, and one unacquainted with the preparations would imagine that Stoke Wood had, in imitation of Birnam Wood's trip to Dunsinane (though with a better object in view), paid a visit to the old city. But we are doing the descriptive rather irregularly, and we'll first ask our readers to step up as far as Peter Lisson's, the best starting point for a more regular description. From the Acland Arms across the road to the higher corner of Summerland-street is a splendid green arch, decked out with pictures (illuminated at night) expressive of the loyalty which everybody knows is so superabundant in the bosom of the worthy Peter: on the right of the face of that side of the arch looking up the street is a motto painted for the occasion, "God Speed the Plough. May Old England ever maintain her Rights." In the middle is a loyal wish expressed that Her Majesty might live long and never forget the principles which placed her forefathers on the throne. On the left is "Loyalty to our Queen, Submission to Her Laws, and Happiness to Her People." On the other side of the arch on the right is the painting of a soldier with his foot on a cannon, and the following motto under, "Quo Fata

Vocant." In the middle, beneath a picture of Her Majesty, is "Long live the Queen and Prince of Wales; may Her Majesty never forget the Principles of her Forefathers; and may her Illustrious Offspring long live to protect our Glorious Constitution in Church and State." On the top of the arch is a crown, the gaiety of the whole scene being greatly enhanced by an elegant display of flags. The effect of the view up and down the street from this spot is most enlivening, from the gay colours of the numerous flags playing in the breeze as if imbued with a spirit of the general rejoicing. Arches are also erected in Parish-street under the direction of Mr. John Ware. Fore-street abounds with flags of the most superior order, and the decorations generally are most superb. At the entrance of Queen-street is a magnificent green arch, 40 feet high, erected under the superintendence of Mr. Huxtable; on the top is a crown, of imitation gold and crimson, seven feet high, made by Mr. Vicary, of this city, the ornamental work being done by Messrs. Dipsdale and Bradley. On the side of the arch facing Fore-street, is lettered "Agriculture and Commerce," and on the side facing Queen-street, "Let Industry be praised," the latter having on one side a painting of the Castle of Exeter, with the motto "Semper Fidelis," and on the other the "Cornucopia." On one side of the former is a wheat sheaf, on the other side a vessel in full sail. On each side of Queen-street, as far as the market, an avenue of young fir trees is placed, the idea of Mr. Sobey, and which has a beautiful effect. Mr. George Ferris, whose superior taste is always discernible on such occasions, has decorated the top of the house, on which is the figure of the Queen, with signal flags, giving it the appearance of a yacht, which we have no hesitation in pronouncing the best show of flags in the city. The loyalty of the occupants of the fish market is most conspicuous, the place being decked out with flags, flowers, and evergreens, "whose silent eloquence, more rich than words" (of the occupants), testifies their right good feeling. The gaiety of the scene does not lack for a moment from one end of the city to the other, and Exe Bridge has one of the most beautiful arches in the town. On each side is a splendid fir tree nearly 30 feet high. The height of the first arch is 21 feet, and over which is raised another arch, about 13 feet diameter, lettered "Victoria," on each side of which is a fine orange tree in full bearing. The arch is composed of green holly and fir, and each side being ornamented with wreaths of flowers (*Lilium aurantiacum*), the arrangement of the whole showing the most exquisite taste. The arch was erected by Mr. Stafford, builder, Bartholomew-street, under the superintendence of Mr. Nott, nursery and seedsman, Bridge-street; Mr. Mogridge and Mr. Furse were also very active in carrying out the arrangement. From the top of South-street to the bottom of Holloway-street there were several arches, all erected by Mr. Mason; and there is a little anecdote connected with the one erected below the Valiant Soldier, which may amuse our readers. Mr. Mason had placed a flag over the crown, without probably knowing what flag it was. Three jolly tars happening soon after to be coming up the street, half seas over, discovered that the flag was an American one, and with the most violent oaths, swore they would never see an American flag float over the British Crown, and that if it was not taken down they would demolish the whole concern. After creating a great hubbub the flag was removed, and the jolly fellows proceeded on their way quite happy. We have not space to say more than that such a display of gaiety was never before witnessed in Exeter, and we are not surprised that the committee should have acknowledged they had never met with such a reception since the society had been in existence.

MEETING AT EXETER.

The twelfth Annual Meeting of the Royal Agricultural Society of England came off on July 16th, 17th, 18th, and 19th, in the ancient city of Exeter, and in no other place has the Society received so warm and flattering a reception.

Exeter has long been considered one of the handsomest of our ancient cities; and, apart from the interest attendant upon the visit of the Royal Agricultural Show, offers many attractions to the tourist and the antiquary. The erection of its earliest mural defences is assigned to Athelstan (A. D. 932), who, amongst other favours, granted it two mints for coinage, a privilege likewise conferred upon it in later times by King William III. From its situation on a hill (whence its old Saxon name of "Penne-hal-te-caire," a "town upon a mount"), and from a broad river flowing at its foot, it was remarkably well calculated for a military position, and was always strongly fortified. Thus, in times of peril, it became a "City of Refuge," and was subjected to many sieges, which if endured with such constancy, always on the side of the Sovereign, that it gained the motto of "Semper Fidelis," a mark of character of which the Exonians of the present day are not a little proud. Its natural strength as a fortified position then caused the distressed to fly to it for protection, and now its remarkably salubrious climate causes invalids to resort to it in search of health. The declivities of the hill afford passages for the freest currents of air, an easy and effectual drainage runs down into the broad river below, wells and conduits abound, the climate is, if anything, too mild, and "the fair city" is reported by the commissioners as one of the most healthy places in the kingdom. At the higher end of the city is situated the ancient castle of Rougemont, so called from the redness of the soil, alluded to by Shakspeare in the following passage in the play of Richard III., as an ill-omen to that much-misrepresented monarch—

"Richmond! When last I was at Exeter
The Mayor in courtesy showed me the castle,
And called it Rougemont; at which name I started,
Because a bard of Ireland told me once
I should not live long after I saw Richmond."

In respect to the origin of the castle, antiquaries seem to be in a perplexity. Some are inclined to attribute it to Julius Cæsar, and others to the West Saxon kings. The only portion now remaining is the entrance-tower (in the gateway of which are still visible the grooves in which the portcullis fell for defence or detention), and a portion of the circumvallating ramparts. It is now part of the pleasure ground attached to the mansion of R. S. Gard, Esq. The greatest object of interest, however, is the venerable cathedral. It consists of a nave with two side aisles, two short transepts, formed out of two massive and highly-decorated Norman towers, the only remains of an earlier structure, in a remarkable manner; a choir, with side aisles; and two oratories dedicated to the Archangels and Apostles. The "Ladye" Chapel, in which the early matin service is performed, is at the east end, and is separated by a screen from the choir. The chapter-house in the cloisters is a very fine building. The cathedral dates from the time of the Conqueror, when it formed the church of a monastery of Benedictine monks, and legends tell of an underground passage of a mile and a half in length, to an abbey at Countesswear, some portions of which remain; and at this place, as well as at the cathedral, the entrances or exit of this mysterious subterranean gallery are still shown.

Bishop Quivill, in 1281, began the restoration of the building, and, with a view to its after magnificence—but

being anxious to preserve the ponderous Norman towers of St. Paul and St. John—he formed the daring project of turning their bases into transepts. The architect accomplished this with great skill, and formed two immense arches to support the superstructure. The transepts are now lighted by two immense windows, in the same style as those of the nave and choir, but certainly not corresponding with the towers themselves. The completion of the choir, the donation of the altar-piece, and the stained glass, which was brought from Rouen, in Normandy, is ascribed to Walter de Stapledon, bishop in 1307, some time Lord High Steward of England, and founder of Exeter College, Oxford. The Episcopal Palace, which in 1789 was so inconvenient that the entertainment of King George III. and the Royal Family was foregone by the bishop and transferred to the dean, has recently been enlarged and beautified under the Ecclesiastical Commission, and can now be associated with the palatial residences of other sees. In the High-street stands the Guildhall, the very ancient portico of which was formerly portion of an ecclesiastical building. The hall is panelled with carved oak and ornamented with pictures, some the gifts of royalty.

Modern improvements have done more for Exeter than for almost any other ancient city in England. The entrance through Queen-street from the railway is of recent date, on approaching which from the station the contrast between the modern style of a "pepper-box" kind of steeple belonging to St. David's church and the Tudor architecture of "good Eliza Hele's" School and Atwill's Almshouses first strikes the attention. The road then branches off on each side of Northernhay (the city mount, and one of the prettiest esplanades in the kingdom). In one stands the County Prison, lately greatly enlarged for the purpose of carrying out the "solitary system," and in the other, the more public thoroughfare, the City Prison, the dwarfish and sombre effect of which is counterbalanced by the florid exuberance opposite one of the Northernhay Lodges, and the gay "Regent-street" appearance of Queen-street. The public market-houses are handsome buildings, in a somewhat heavy style, but they are confronted by an elegant range of edifices, including a new post-office, the Bankruptcy Court, and other public buildings and shops. From the midst of these modern improvements the visitor suddenly finds himself in the middle of "the High-street," one of those wide, handsome thoroughfares which our forefathers occasionally achieved rather by accident than design, if one may judge by the narrowness of all the other streets of our ancient towns. It is the counterpart of that at Southampton, and although it now possesses fewer ancient buildings, its shops are of a more modern character.

Though the proceedings of the show did not commence formally until Wednesday, the note of public rejoicing had already been sounded; flags of all nations, parties, and colours, were hung out from the windows, triumphal arches spanned the principal streets, mottoes of a patriotic and agricultural character appeared on every side, with a due proportion of evergreens around them to set them off, and make them have a refreshing effect. In most of the shop windows tickets announced that comfortable accommodation might be had within by strangers. The hotels were all prepared to be besieged by an overpowering force of visitors, and no garrison threatened by a strict blockade ever laid in provisions of all kinds with greater care. At the railway terminus, immense quantities of stock arrived by every train, and these, as they passed along the road to the show-yard, became objects of great attention. The larger animals made out the distance on foot, while the pigs and sheep were conveyed comfortably in vans, the exertion of a mile's walk being quite out of the question with them.

In the selection of the spot where their exhibition took place, the society have this year been less guided by an eye to the picturesque than to the convenient; and the preference they have thus shown is no doubt a wise one, though the general public might wish, while gratifying their curiosity in matters agricultural, to have it combined in some degree with scenic effect, as has generally been the case at previous meetings. The show-yard lay south-east from the city about a mile, in a field belonging to Mr. Turner, of Barton, and enclosed on nearly every side by hedge-row elms, the ornament of Devonshire landscapes, although an obstacle to its agriculture.

IMPLEMENT DEPARTMENT.

STEWARDS OF IMPLEMENTS.—Colonel CHAL-
LONER, Hon. DUDLEY PELHAM, M.P., and Sir
MATTHEW WHITE RIDLEY, Bart.

JUDGES OF IMPLEMENTS.—Messrs. C. J. CARR,
W. OWEN, WILLIAM LISTER, JOHN OVERELL,
THOMAS SCOTT, I. H. NALDER, CHARLES PAGET,
THOMAS HAWKINS, OWEN WALLIS, — OUTH-
WAITE. Consulting engineers—Messrs. EASTON
and AMOS.

The trial of Implements commenced early in the week, prior to the show, within the enclosed trial grounds attached to the show yard, and to these trials it would be obviously impossible to admit the public without interfering with the operations of the judges and their calm and deliberate examination as to the relative merits of each implement. The trials of the larger implements, however, were openly carried on in some fields about three miles north and east of the city. The principal trial of drills, ploughs, subsoilers, scarifiers, drain cutters, turf-parers, &c., adapted to light land, took place on Saturday se'nnight, on the farm of Mr. William Rew, at Whipton Barton, on Lord Poltimore's estate. It has a deep red loamy surface soil, with a gravelly subsoil. The Rew family have been tenants to the Portmoe family for more than three hundred years; and, judging from their size and appearance (they are all six feet men at the least) the connection has not been a disadvantageous one for the tenants. The Messrs. Rew (for there are several brothers at this time who all hold farms under Lord Poltimore) are admirable specimens of the Devonshire yeoman, and we were informed that their farms are excellent specimens of the best style of Devonshire farming.

The trial of implements upon the heavy land was upon the farm of Mr. Henry Rew. The tenacious clay of which the soil is chiefly composed was, however, by the scorching sun baked to a hardness which seems to defy the most powerful clod-crushers and the most "earth-terrifying" Norwegian harrows. In the field below, the ploughing and subsoiling were conducted with greater success, as the nature of the ground did not offer such formidable obstacles. It was, however, well understood that the awards of the judges would be guided by the capabilities of the implements; not as to what they may effect under certain favourable circumstances, but as to what they would do in the rough and smooth average daily work of the farm.

These trials, as might be expected, excited great interest amongst the practical men, particularly those resident in Devonshire; and such of the experiments as were open to the public were numerously attended.

The following table will show the Entries of Stock and

Implements at the different Meetings since the Society was established:—

Year of Meeting.	Locality.	Entries of Stock.	Entries of Implements.	Receipts.	Expenditure.	Excess of Expenditure.
1839	Oxford	249	23	£ 2349	£ 2688	£ 294
1840	Cambridge ..	252	36	3416	3589	173
1841	Liverpool	319	312	4106	5052	946
1842	Bristol	510	455	4202	4775	573
1843	Derby	730	508	3390	5090	1700
1844	Southampton	575	948	4929	5736	807
1845	Shrewsbury ..	437	942	3662	5166	1504
1846	Newcastle....	613	735	4119	4866	747
1847	Northampton	459	1321	4565	4863	293
1848	York	724	1508	4831	5957	1126
1849	Norwich	638	1976	4344	4351	7
1850	Exeter	619	1202	..	..	..

This year, on entering the implement yard, those who have been in the habit of attending the anniversary exhibition of the Royal Agricultural Society would observe the reduced space the implements occupied, as compared with the last four or five shows. At Norwich, last year, there were 145 exhibitors, while this year there are but 118. The situation of Exeter being far less central than any other former place of exhibition chosen by the society would have a tendency to reduce the number of exhibitors, nevertheless its remoteness introduced to its visitors peculiarities which to many of them would be very remarkable.

PRIZES FOR IMPLEMENTS.

The following are the awards of the judges, as far as they are now made, four prizes being yet undecided:—

- For the plough best adapted for general purposes, £7—Mr. William Ball, of Rothwell, near Kettering, Northamptonshire.
- For the plough best adapted for deep ploughing, £7—Messrs. John Howard & Son, of Bedford.
- For the best one way, or turn-wrest plough, £5—Mr. Henry Lowcock, of Thorverton, Devonshire.
- For the best paring plough, £5—Mr. Thomas Glover, Thrusington, near Leicester.
- For the best subsoil pulverizer, £5—Messrs. John Howard and Son.
- For the best drill for general purposes, £10—Messrs. Richard Garrett & Son, of Saxmundham, Suffolk.
- For the best pair-horse steerage corn and turnpike drill, £10—Messrs. Richard Hornsby & Son, of Spittlegate, near Grantham.
- For the best drill for small occupations, £5—Messrs. Richard Garrett & Son.
- For the best turnip drill on the flat, £10—Messrs. Richard Hornsby & Son.
- For the best turnip drill on the ridge, £10—Messrs. Richard Hornsby & Son.
- For the best drop drill for depositing seed and manure, £10—Messrs. Richard Garrett & Son.
- For the best manure distributor, £5—Messrs. Holmes & Son, of Norwich.
- For the best portable steam-engine, applicable to thrashing or other agricultural purposes, £50—Messrs. R. Hornsby & Son.
- For the best thrashing machine for thrashing corn or seeds, either by steam or horse-power, £20—Messrs. Hensman, of Woburn.
- For the second best ditto, ditto, £25—Messrs. Clayton Shuttleworth & Co., of Lincoln.
- For the best corn-dressing machine, £10—Messrs. R. Hornsby & Son.

For the best linseed and corn crusher, £5—Mr. W. P. Stanley, of Peterborough.
 For the best chaff cutter, £10—Mr. John Cornes, of Barbridge, Cheshire.
 For the best turnip cutter, £5—Mr. B. Samuelson, Banbury, Oxfordshire.
 For the best oil-cake breaker (for every variety of cake), £5—Mr. W. N. Nicholson, of Newark, Notts.
 For the best one-horse cart for general purposes, £10—Mr. W. Busby, of Newton-le-Willows, Yorkshire.
 For the best light waggon for general purposes, £10—Mr. W. Crosskill, of Beverley.
 For the best machine for making draining tiles or pipes, £20—Mr. Henry Clayton, of Upper Park-lane, Dorset-square, London.
 For the best set of tools for general draining, £3—Messrs. Mapplebeck and Lowe, of Birmingham.
 For the best heavy harrow, £5—Messrs. Williams and Taylor, of Bedford.
 For the best light harrow, £5—Mr. John Howard & Son.
 For the best cultivator, grubber, and scarifier, £10—Messrs. Smith & Co., of Stamford.
 For the best pair-horse scarifier, £5—Mr. E. H. Bentall, of Highbridge, Essex.
 For the best horse hoe on the flat, £10—Messrs. R. Garrett & Son.
 For the best horse hoe on the ridge, £5—Mr. W. Busby.
 For the best horse rake, £5—Messrs. John Howard and Son.
 For the best horse seed dibbler, or seed depositor, not being a drill, £10—prize withheld.
 For the best barrow hand drill, to work with cups, £3—Messrs. R. Garrett & Son.
 For the best liquid manure distributor, £10—Messrs. T. R. and J. Reeves, of Bretton, Wilts.
 For the best haymaking machine, £5—Messrs. Smith & Co., of Stamford.
 For the best cottage stove or range for burning coals, £5—Mr. W. N. Nicholson.
 For the best and most economical steaming apparatus for general purposes, £5—Mr. W. P. Stanley.
 The prize for the best cider mill, £10, could not be awarded, because no apples could be obtained to try it.

SILVER MEDALS.

For improvement to the steerage, and adoption of vulcanized India rubber pipes, in place of tin conductors, for seed—Messrs. R. Hornsby & Son.
 For draining plough and windlass, and pipe-making machine—Mr. John Fowler, Jun., of Melksham, Wilts.
 For expansion movement in horse hoe—Messrs. Edward Hill and Co., of Dudley, Staffordshire.
 For double cistern patent agricultural fire engine—Mr. Richard Read, 35, Regent-circus, London.
 For a new patent cottage stove—Mr. W. Nicholson.
 For a patent churn—Mr. B. Samuelson.
 For a permanent and portable farm railway—Mr. W. Crosskill.

HIGHLY COMMENDED.

General purpose drill—Messrs. Hornsby and Son.
 Liquid manure drop drill—Messrs. Reeves.
 Plough for general purposes—Mr. W. Busby.
 Uley cultivator—Mr. W. Crosskill.
 Clod crusher—Mr. W. Crosskill.
 Steam engine—Messrs. Garrett & Son.

COMMENDED.

Small dibbling drill—Mr. W. Busby.
 Horse hoe for small occupations—Mr. W. Smith.
 Hand-manure distributor—Messrs. Dufaur & Co.
 Plough for deep ploughing—Messrs. W. Hensman & Son.

Subsoil pulverizer—Messrs. R. Gray & Son.
 Horse hoe on ridge—Messrs. Garrett and Son.
 Norwegian harrow—Mr. W. Crosskill.
 Potato plough—Mr. John Milward.
 Gutter plough—Mr. Thomas Moore.
 Wrought iron skim—Messrs. Edward Hill & Co.
 Tile machine—Mr. John Whitehead.
 Winnowing machine—Messrs. W. Hensman & Son.
 Chaff machine—Messrs. Smith.
 Steam engine—Messrs. Deane, Day, and Deane.
 Steam engine—Messrs. Barrett, Exall, and Andrews.

It will be seen that the Messrs. Garrett have taken 5 prizes and a medal; Messrs. Hornsby & Son, 5 prizes and a medal; Messrs. Howard & Son, 4 prizes; while Messrs. Stanley, Nicholson, Busby, Smith and Co., have taken 2 prizes each; a medal was also awarded to Mr. Nicholson.

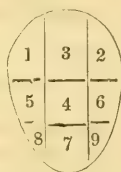
One implement attracted great attention, the draining plough, for which Mr. John Fowler, jun., obtained a silver medal. It is described in the catalogue as invented by the exhibitor, and as being a mole or plug plough for making a hole in the soil at depths varying from two to four feet, and at the same time drawing into the hole thus made any draining material, such as earthen or wooden pipes, straw, ropes, &c. There is an apparatus attached for raising or sinking the plough, so as to lay a level drain under an uneven surface. It is drawn by the power of a windlass, and one horse's power exerted there will move the plough a yard in 20 seconds, at a depth of two feet six inches. Three horses, four men, and six boys, will keep two ploughs going, and do 4,000 feet in a day, at a depth of three feet. A hole requires to be dug for the machine every 100 yards, or six for an acre. This implement is altogether the most remarkable feature of the exhibition, though of course its real value remains to be decided by experience though it is obviously open to the objections made to all attempts at draining by mechanical means—namely, those which arise where a gravelly or stony subsoil has to be dealt with as well as clay.

PROFESSOR SIMONDS' LECTURE ON THE DISEASES, ETC., OF THE LIVER.

WEDNESDAY, JULY 17.

Doors were opened at half-past 5, and the President the Marquis of Downshire, having taken the chair, the learned lecturer proceeded somewhat as follows:—The liver is one of the most important of the internal organs, as it separates injurious matter from the blood. Food entering into the stomach is digested; it then passes into the intestinal canal, where it is mixed with the bile and pancreatic juice; and it is by the combined action of these fluids upon the chymous mass that its change into nutriment is effected. As to the anatomy of the liver, it is one of the largest organs, and is denominated a *gland*, because it separates fluid from the blood. In one important respect, however, it differs from all other glands, viz., in separating the fluid from impure or venous blood. The liver of animals differs in size without reference to their bulk, that of herbivorous animals being generally the smallest. The human frame has several large cavities, each containing important parts of the viscera; thus, the heart is in the chest—the stomach, &c., in the abdomen, which is divided from the chest by a membrane termed the diaphragm. Anatomists divide the abdomen into regions, by means of two transverse lines drawn from the inferior ribs to the opposite and

from hip to hip; and also by two vertical lines. The whole arrangement may be figured thus—



and the spaces are named as follows:—1, right hypochondriac region; 2, left ditto; 3, epigastric; 4, umbilical; 5, right lumbar; 6, left ditto; 7, hypogastric; 8, right iliac; 9, left ditto. The hypochondriac regions are so named because they lie beneath the cartilage of the ribs; the umbilical, because it contains the navel; the epigastric, because it is above the stomach; the hypogastric, because it is under the stomach. The liver is situated in the middle one of the three great regions, termed upper, middle, and lower; sometimes stretching up into the epigastric region. It is divided into lobes. In horses it consists of a right and left lobe, with a *lobus cistatus*, or notched lobe, in the centre. In the ox and sheep the notches are absent, and there are three lobes—right, left, and middle. In some animals there is an appendage called the gall bladder; but the horse has none. Its absence is not confined to any particular tribe, as it is found in some of the deer tribe, and not in others. This receives secretion from the liver; but is not necessary to the life of animals, as horses and some other species do without. The liver being a secreting gland, and receiving much impure blood, has veins from nearly all the organs entering into it. The anterior and posterior mesenteric veins (from the large and small intestines), and the splenic, pancreatic, and gastric veins (from the spleen, pancreas, and stomach), combine to form the vena portæ, which conveys the blood into the middle lobe of the liver. Thus, there is a constant conveyance into this organ of matters in the blood which are not essential to the general well-being, but only to the heat of the animal. The vena portæ comports itself like an artery, *i.e.* it splits up into a number of veins so minute as to be named capillaries, which traverse the liver in every part; and it is in these that secretion takes place. The liver is also excretory. For in foetal life in some animals it receives the whole of the blood before it passes into the foetus. The veins pass through the portal canal, which is lined with cellular tissue. The veins, biliary ducts, and arteries, lie in a triple form thus: $\begin{smallmatrix} \circ & \circ & \circ \end{smallmatrix}$ with cellular tissue upon them; an arrangement which the lecturer very aptly illustrated by a reference to three drain-pipes in a trench bedded down with straw. The various vessels are split up into lobules, the veins and ducts being named intralobular, interlobular, &c., according as they are within or between the lobules. So much for the anatomy.—The blood is purified by the bile which is secreted in the biliary ducts, the latter liquid exerting an influence upon the ligneous and starchy portions of the food, converting them into sugar; and this being soluble is suitable for nourishing the system. Within a few months past, experiments have been undertaken, in this and other countries, to ascertain what is the precise action of the pancreas and liver; and it has been found that although the pancreas chiefly is engaged in forming sugar, yet the liver also does the same; and thus it has been shown, in opposition to Liebig and others, that the animal is capable of generating a chemical principle, *viz.*, sugar. The bile cells contain fat, and the liver

has much sugar, from which fat is derived, there being a new light thrown upon the formation of fat in animals by this modern theory. Bile not only acts upon the food, but is also excrementitious. The colouring matter of the bile is found in the intestinal canal; and if there be too much here, the effect is diarrhoea. Having briefly touched upon the physiology, we now come to the diseases of the liver. This organ, like all others, is liable to derangement and structural changes. Its functions are very soon deranged, especially by placing the animal in a high temperature. Hence in tropical climates liver diseases abound, and animals are peculiarly subject to such maladies during the summer. Now, there is one disease of the liver called jaundice, which depends often on functional derangement, sometimes upon structural changes, or obstruction; in fact, there are three or four causes for it. This shows the necessity of consulting some individual who has made such things his study, and who is able to detect each of these causes. Whereas, to the unpractised, the effects of all these may appear alike. If the character of the secretions depend upon the purity of the blood, and if this again depend on the nature of the food, then, as is the food so will be the bile; and from the wrong quality of the food, &c., the bile may become thickened, may run together; and thus we have calculi both in the ducts and in the gall bladder. Here then comes the question, if an animal is affected in this manner, is it from gall-stones or not? If so, there may be little danger; but if the calculus be in the biliary duct, great harm will result; for in the former case there is no obstruction to the flow of the bile, in the latter there is. This is of more importance in the sheep than in the ox; for in the former the pancreatic duct joins with the biliary duct before entering the intestinal canal. A calculus in the biliary duct hinders the passage of that which forms nutriment; and, as when the liver secretes too much bile it runs into the membranes, &c., of the body, the calculus sends it in the same direction. It likewise affects the urinary secretions; but when gall-stones cause jaundice, there is no diarrhoea, and the urine is not rendered brown. A practised man, therefore, would distinguish, by these and other symptoms, between the different sources of the disease. Now, as to treatment—If the cause is inflammation, get rid of the constipation in the bowels by aperient medicine, and there may be also an application of counter-irritants to the side. A gallstone requires a different mode of treatment. We must get rid of the mechanical obstruction—we must excite the ducts to throw off more bile, so as to drive it away. These remarks lay the foundation for a few observations upon the rot in sheep. No disease has received so much attention; and it is most important to the farmer that we should enquire into its nature. Rot depends in a great measure upon the quality and kind of food with which sheep are fed, some pastures being notorious for it, others entirely free. As a broad principle it may be stated that when there is an excess of moisture, the food is prejudicial to the animal. This malady is not peculiar to this country, but prevails over Europe and Asia, and in Egypt after the Nile waters have subsided; showing that the cause is not in the soil, nor in the temperature, since it occurs upon any soil and with any temperature. Perhaps there is more than one cause. Is there any particular period of the year during which it is most prevalent? We should say that it is from this time to the autumn. If a large quantity of rain were now to fall, there would be a luxuriant herbage, but that would be deficient in nutriment, and a great amount of moisture would be taken into the system of the animals which ate it. We have said that in the first stages of the disease there is a considerable accumulation of fat,

Now, sheep put on to water-meadows at this season are almost sure to have the rot; and as this directly induces fatness, sheep have been fed in this way for the market. [The Marquis of Downshire here communicated a statement to the effect that the way to fatten sheep was to flood the meadows they were on with water two inches deep, and keep it there.] The bile next loses its properties of supplying nutrifying matter. The blood consequently becomes impure all over the system, for the same reason that pure water is never obtained from a poisoned fountain. We must now advert to those parasites of the liver called flukes, which in the gall ducts produce the effect of a structural change. Some think that these oviparous animals are the origin of rot. The feculent matter of rotten sheep contains millions of ova of the flukes, and just as an egg will keep for any length of time until heat is applied and the chick hatched, so these ova, while on the pastures, undergo no change; but in their natural habitat, the body of the animal, they quickly develop themselves. Wheat, in the same way, has been locked up in mummies for thousands of years, and then being sown produced plants. Youatt, in his work on sheep, treating of the anatomy of the fluke, describes organs which do not exist. What he calls the "eye," is a sucking disc by which the animal adheres to the liver. Flukes are bisexile or hermaphrodites. They have another disc at one extremity of the body, by some supposed a mouth; but if not, their nutriment, (viz. bile), must be imbibed by the whole surface of the body. When placed dead in warm water they will swell very much, which seems to indicate a considerable absorbing power. In conclusion, as to the principle that should guide us in the treatment of rotting sheep. Two years ago seven or eight sheep, each showing the rot in its advanced stages, were put in a shed and supplied with dry and nutritious food; two were cured, the liver being still affected, but so little that they might have lived for years. Rot is a disease analogous to dropsy. It arises from impure blood, that blood being rendered innutritious by the water it contains, and the water penetrates into the cellular tissue, between the jaws, &c. This has led writers into "sections" of this disease; but "water-rot" and "fluke rot" are only less or more advanced stages of one disease. If flukes exist we must strike at the root, get rid of the animalcules, and we must do this by bringing about a healthy condition of the animal, since no medicine will act directly upon the flukes. Many persons advocate the use of salt, it being a stimulant to the digestive organs. Some people keep it in troughs for their sheep to help themselves to; and it is certainly an excellent preventive. We know that it matters not how moist salt marshes are, for rot will not attack flocks there. But can we not do better? Salt has an injurious effect upon the stomach. We should throw tonics into the system. Mineral tonics are the best, and sulphate of iron gives the greatest tone. We have said that the kidneys now do what the liver ought to have done, and we should therefore stimulate them to greater action. We do not mean to recommend the exhibition of ordinary diuretic agents, because they produce debility; but the spirit of nitric ether, which is a good medicine. We ought, then, to husband the animal's powers by placing him in a proper situation, dry, &c.; supply him with nutritious and dry food; we should mix it with salt, and we should administer small quantities of sulphate of iron and nitric ether. We have no doubt that the farmer, by attention to these points, would often have to rejoice that he had not sent his sheep to the knacker, but to the butcher.

Mr. Brandreth having proposed a vote of thanks to the learned and lucid lecturer, the Marquis of Downshire thanked Professor Simonds on behalf of the meet-

ing. Mr. Gibbs then read the awards of the judges of stock. Much interest was evinced during the lecture, the cheers rising highest whenever a fact was stated such as the stockowners present knew to be correct.

CATTLE DEPARTMENT.

STEWARDS OF THE CATTLE YARD.—Mr. HUDSON of Castleacre, Mr. STOKES, and Mr. JONAS.

LIST OF PRIZES.

SHORT-HORNS.

JUDGES: Messrs. WM. COX, WM. SMITH, and WM. BARTHOLOMEW.

CLASS 1.—Bulls calved previously to the 1st January, 1848.
First prize of £40, to Mr. Henry Anbler, of Watkinson Hall, near Halifax.

Second prize of £20, to Mr. John F. P. Phillips, of Broomborough, near Totnes.

CLASS 2.—Bulls calved since the 1st January, 1848, and more than one year old.

First prize of £20, to Mr. Richard Booth, of Warlaby, near Northallerton.

Second prize of £10, to Mr. Charles Towneley, of Towneley Park, near Burnley.

CLASS 3.—Cows in Milk or in Calf.

First prize of £20, to Mr. Richard Booth, of Warlaby, near Northallerton.

Second prize of £10, to Mr. Richard Booth, of Warlaby, near Northallerton.

CLASS 4.—In-calf Heifers, not exceeding three years old.

First prize of £20, to Mr. Benjamin Wilson, of Brawith, near Thirsk.

Second prize of £10, to Mr. John M. Hopper, of Newham Grange, Middlesborough-on-Tees.

CLASS 5.—Yearling Heifers.

First prize of £20, to Mr. Charles Towneley, of Towneley Park, near Burnley.

Second prize of £5, to Mr. Charles Towneley, of Towneley Park, near Burnley.

HEREFORDS.

JUDGES: Messrs. H. CHAMBERLAIN, J. THOMAS, and H. TRETHERWY.

CLASS 1.—Bulls calved previously to the 1st January, 1848.

First prize of £40, to Mr. John Monkhouse, of the Stow, Hereford.

Second prize of £20, to Mr. John Walker, of Westfield House, Holmer, Hereford.

CLASS 2.—Bulls calved since the 1st January, 1848, and more than one year old.

First prize of £20, to Mr. W. Perry, of Cholestrey, near Leominster.

Second prize of £10, to Mr. James Walker, of Northleach, Gloucester.

CLASS 3.—Cows in Milk or in Calf.

First prize of £20, to Mr. J. N. Carpenter, of Eardisland, near Leominster.

Second prize of £10. No animal exhibited.

CLASS 4.—In-calf Heifers, not exceeding three years old.

First prize of £20, to the Right Hon. Lord Berwick, of Cronkhill, near Shrewsbury.

Second prize of £10, to Mr. George Pitt, of Wellington, near Hereford.

CLASS 5.—Yearling Heifers.

First prize of £10, to the Right Hon. Lord Berwick, of Cronkhill, near Shrewsbury.

Second prize of £5, to the Right Hon. Lord Berwick, of Cronkhill, near Shrewsbury.

DEVONS.

JUDGES: Messrs. E. PESTER, T. TOWNSEND, and T. HARTSTORN.

CLASS 1.—Bulls calved previously to the 1st January, 1848.

First prize of £40, to Mr. George Turner, of Barton, near Exeter.

Second prize of £20, to Mr. John Passmore, of Bishop's-nympton, near Southmolton.

CLASS 2.—Bulls calved since the 1st January, 1848, and more than one year old.

First prize of £20, to Mr. James Quartly, of Molland, near Southmolton.

Second prize of £10, to Mr. John Quartly, of Champson Molland, near Southmolton.

CLASS 3.—Cows in milk or in calf.

First prize of £20, to Mr. James Quartly, of Molland, near Southmolton.

Second prize of £10, to Mr. James Quartly, of Molland, near Southmolton.

CLASS 4.—In-Calf Heifers, not exceeding three years old.

First prize of £20, to Mr. James Quartly, of Molland, near Southmolton.

Second prize of £10, to Mr. W. M. Gibbs, of Bishops-Lydeard, near Taunton.

CLASS 5.—Yearling Heifers.

First prize of £10, to Mr. John Quartly, of Champson Molland, near Southmolton.

Second prize of £5, to Mr. James Quartly, of Molland, near Southmolton.

CATTLE OF ANY BREED.

Not qualified to compete as Short Horns, Herefords or Devons. (Cross-bred excluded).

JUDGES: Messrs. H. CHAMBERLAIN, J. THOMAS, and H. TRETHERWY.

CLASS 1.—Bulls calved previously to the 1st January, 1848.

First prize of £20, to Mr. Richard H. Chapman, of Upton, near Atherstone.

Second prize of £10, to Mr. James Gorrington, of Tilton Farm, Selmeiston, near Lewes.

CLASS 2.—Bulls calved since the 1st January, 1848, and more than one year old.

The prize of £10. No animal exhibited.

CLASS 3.—Cows in milk or in calf.

First prize of £10, to Mr. James Gorrington, of Tilton Farm, Selmeiston, near Lewes.

Second prize of £5, to Mr. N. Le Beir, of the Castel parish, near St. Peter's Port, Guernsey.

CLASS 4.—In-calf Heifers, not exceeding three years old.

The prize of £10, to Mr. Thomas Beards, of Stowe, near Buckingham.

CLASS 5.—Yearling Heifers.

The prize of £5, to Mr. Thomas Beards, of Stowe, near Buckingham.

HORSES.

JUDGES: Messrs. W. C. SPOONER, W. F. KARKEEK, and C. BOWMAN.

CLASS 1.—Stallions for Agricultural Purposes, of any age.

First prize of £30, to Mr. Thomas Beale Brown, of Hampden, near Andoversford, Gloucester.

Second prize of £15, to Mr. N. G. Barthropp, of Cretingham Rookery, near Woodbridge, Suffolk.

CLASS 2.—Two-year-old Stallions for Agricultural Purposes. First prize of £20, to Mr. F. T. Bryan, of Knossington, near Oakham.

Second prize of £10, to Mr. David Wright, of Hepworth, near Ixworth, Suffolk.

CLASS 3.—Roadster Stallions.

The prize of £15, to Mr. Charles Poulton, of No. 7, Sidney-terrace, Reading.

CLASS 4.—Mares and Foals for Agricultural Purposes.

First prize of £20, to Mr. John Ward, of East Mersea, near Colchester.

Second prize of £10, to Mr. N. G. Barthropp, of Cretingham Rookery, near Woodbridge, Suffolk.

CLASS 5.—Two-years-old Fillies.

First prize of £15, to Mr. N. G. Barthropp, of Cretingham Rookery, near Woodbridge, Suffolk.

Second prize of £5, to Mr. William Fisher Hobbs, of Boxted Lodge, near Colchester.

LEICESTER SHEEP.

JUDGES: Messrs. WILLIAM TORR, VALENTINE BARFORD, and JOHN HALL.

CLASS 1.—Shearling Rams.

First prize of £30, to Mr. William Abraham, of Barnethy-le-Wold, near Brigg, Lincoln.

Second prize of £15, to Mr. William Sanday, of Holme Pierrepont, Nottingham.

CLASS 2.—Rams of any other age.

First prize of £30, to Mr. William Abraham, of Barnethy-le-Wold, near Brigg, Lincoln.

Second prize of £15, to Mr. William Sanday, of Holme Pierrepont, Nottingham.

CLASS 3.—Pens of Five Shearling Ewes of the same Flock.

First prize of £20, to Mr. William Abraham, of Barnethy-le-Wold, near Brigg, Lincoln.

Second prize of £10, to Mr. William Sanday, of Holme Pierrepont, Nottingham.

SOUTH-DOWN, OR OTHER SHORT-WOOLLED SHEEP.

JUDGES: Messrs. ROBERT OVERMAN, EDWARD TRUMPER, and L. P. MATON.

CLASS 1.—Shearling Rams.

First prize of £30, to Mr. William Sainsbury, of West Lavington, near Devizes.

Second prize of £15, to Mr. William Sainsbury, of West Lavington, near Devizes.

CLASS 2.—Rams of any other age.

First prize of £30, to Mr. William Rigden, of Hove, near Brighton.

Second prize of £15, to Mr. William Sainsbury, of West Lavington, near Devizes.

CLASS 3.—Pens of Five Shearling Ewes of the same Flock.

First prize of £20, to Mr. William Rigden, of Hove, near Brighton.

Second prize of £10, to his Grace the Duke of Richmond, of Goodwood, Chichester.

LONG-WOOLLED SHEEP.

Not qualified to compete as Leicesters.

JUDGES: Messrs. ROBERT BEMAN, WM. GILLET, and EDWARD CLARKE.

CLASS 1.—Shearling Rams.

First prize of £20, to Mr. George Hewer, of Ley Gore, near Northleach.

Second prize of £10, to Mr. William Garne, of Aldesworth, near Northleach.

CLASS 2.—Rams of any other age.

First prize of £20, to Mr. William Garne, of Aldesworth, near Northleach.

Second prize of £10, to Mr. William Lane, of Eashington, near Northleach.

CLASS 3.—Pens of Five Shearling Ewes of the same Flock.

First prize of £10, to Mr. Charles Large, of Broadwell, near Lechlade, Gloucester.

Second prize of £5, to Mr. Charles Large, of Broadwell, near Lechlade, Gloucester.

PIGS.

JUDGES: Messrs. J. CLAYDEN, J. HANNAM, and W. BULLEN.

CLASS 1.—Boars of a large breed.

First prize of £15, to Mr. Moses Cartwright, of Stanton-hill, near Burton-on Trent.

Second prize of £5, to Mr. John H. Ley, of Trehill, near Exeter.

CLASS 2.—Boars of a small breed.

First prize of £15, to Mr. John Bartlett, of Lifton, near Launceston.

Second prize of £5, to Mr. John Radmore, of Thorverton, near Collumpton.

CLASS 3.—Breeding Sows of a large breed.

The prize of £10, to Mr. Joseph Tuley, of Ecley Head, near Keighly, Yorkshire.

CLASS 4.—Breeding Sows of a small breed.

The prize of £10, to Mr. W. Northey, of Lifton, near Launceston.

The judges considered the competition in class 4 for sows of a small breed to be almost unprecedented.

CLASS 5.—Pen of Breeding Sow Pigs of a large breed.

The prize of £10, to Mr. Moses Cartwright, of Stanton-hill, near Burton-on-Trent.

CLASS 6.—Breeding Sow Pigs of a small breed.

The prize of £10, to Mr. George Turner, of Barton, near Exeter.

LOCAL PRIZES.

SOUTH-HAMS CATTLE.

JUDGES: MESSRS. EMANUEL PESTER, THOMAS TOWNSEND, and T. HARTSHORNE.

CLASS 1.—Bulls calved previously to the 1st January, 1848.

First prize of £20, to Mr. Philip Loe, jun., of Stokenham, near Kingsbridge, Devon.

Second prize of £10, to Mr. Nicholas Pitts, of South Allington, near Kingsbridge.

CLASS 3.—Cows in calf or in milk, having produced a living calf within the previous twelve months.

First prize of £15, to Mr. R. H. Watson, of Dorsey Farm, near Totness.

Second prize of £5, to Mr. R. H. Watson, of Dorsey Farm, near Totness.

COMMENDATIONS.

SHORT-HORNS.

CLASS 3.—Generally commended.

CLASS 4.—The judges highly commend, Lord Feversham's heifer; Mr. Kirkham's heifer; Mr. R. Stratton's heifer; Mr. Towneley's heifer, and Mr. B. Wilson's heifer.

HERTFORDS.

CLASS 1.—Mr. W. O. Bigg's bull.

CLASS 4.—Mr. Craddock's heifer, and Mr. George Pitts' heifer, commended.

DEVONS.

CLASS 1.—Highly commended, Mr. Thomas Miller's bull.

CLASS 2.—Very highly commended, Mr. T. B. Morle's bull.

CLASS 3.—Very highly commended, Mr. James Quartly's cow.

CLASS 4.—Mr. J. Farthing's cow, and Mr. James Quartly's heifer.

HORSES.

CLASS 1.—Highly commended, Mr. H. Matthews' stallion; commended, Mr. Thomas Renton's stallion, Messrs. S. and R. Spencer's stallion, and Mr. W. Sherley's stallion.

CLASS 2.—Commended, Mr. N. G. Barthropp's stallion.

CLASS 3.—Highly commended, Mr. William Giles's stallion; commended, Mr. Job White's stallion.

CLASS 4.—Commended, the Right Hon. Lord St. John's mare and foal; highly commended, Mr. E. Wilcox's mare and foal.

CLASS 5.—Commended, Mr. N. G. Barthropp's filly; highly commended, Mr. W. Fisher Hobb's filly.

LEICESTERS.

CLASS 3.—Commended, Mr. Wm. Sanday's pen of ewes.

SOUTH-DOWNS.

CLASS 1.—Commended, Mr. Wm. Sainsbury's ram.

CLASS 2.—Commended, Mr. Wm. Sainsbury's ram.

CLASS 3.—Commended, Mr. Shelley's pen of ewes.

LONG WOOLS.

CLASS 1.—Highly commended, Mr. George Hewer's ram; commended, Mr. Charles Large's ram.

CLASS 2.—Commended, Mr. William Garne's ram; highly commended, Mr. William Lane's ram.

PIGS.

CLASS 1.—Commended, Mr. R. Kinneir's boar; highly commended, Mr. Mark Stainsby's boar.

CLASS 2.—Commended, Mr. J. T. Davy's boar, Mr. John Hole's boar, Mr. James Hardwick's boar, and Mr. Wm. Fisher Hobbs' boar; highly commended, Mr. H. L. Maw's boar, Mr. John Savery's boar, and Mr. Joseph Tuley's boar.

CLASS 3.—Highly commended, Mr. Moses Cartwright's sow; commended, Mr. Moses Cartwright's sow, and Mr. J. A. Thomas's sow.

CLASS 4.—Commended, Mr. William Ball's sow; highly

commended, Mr. Richard Bartlett's sow; commended, Mr. Frederick Barlow's sow, Mr. J. T. Davy's sow, and Mr. Richard Mogridge's sow; highly commended, Mr. John Moon's sow, and Mr. J. F. P. Phillips's sow; commended, the Right Hon. the Earl of Radnor's sow; highly commended, Mr. John Savery's sow, Mr. Mark Stainsby's sow, Mr. John Wippell's sow, and Mr. Joseph Tuley's sow.

CLASS 5.—Commended, Mr. Joseph Tuley's three breeding sows; highly commended, Mr. G. D. Trotter's pen of breeding sows.

CLASS 6.—Commended, Mr. W. M. Barber's three breeding sows; highly commended, Mr. John Catherall's three breeding sow pigs, and Mr. W. Fisher Hobbs' three breeding sow pigs.

EXTRA STOCK.

Highly commended, Mr. Chas. Towneley's heifer, Mr. G. Coombe's pen of ewes, and Mr. Mark Stainsby's pen of pigs.

PAVILION DINNER.

STEWARDS OF THE DINNER.—HON. ROBERT HENRY CLIVE, M.P., SIR JOHN V. B. JOHNSTONE, BART., M.P., AND MR. SHAW, OF LONDON.

The programme of the proceedings this year indicates a more careful supervision on the part of the Council, and more judicious arrangements than they have on any previous occasion displayed. Not only has the business of the meeting been rendered more attractive to the public, but the patrons and friends of agriculture have been spared the pain and mortification of eating a bad dinner, for which they used to pay a guinea per head. The Council dinner, as it was called, proved at every anniversary dinner a complete failure, and this year it has been wisely suppressed. Not only was it an unsatisfactory part of the proceedings in itself, but it tended to keep up an exclusive and aristocratic distinction, many of the middle and smaller class of farmers being disinclined, and some of them unable to pay a guinea for a dinner. An institution of this kind to be really valuable, and to serve all the purposes for which it is intended, must be popular in its constitution and working. It is right that in the interest of the landlord class should be fairly represented, but if the proceedings and management are such as to exclude the great body of tenant-farmers from their share of influence and consideration, farewell to all prospect of agricultural improvement through such an agency. It is satisfactory, therefore, to see any changes effected which are likely to destroy invidious distinctions between the wealthier and poorer members of the Society, and to unite them more thoroughly and heartily in the cause of improved cultivation. The Council dinner being abolished, the grand banquet took place, in a spacious pavilion, at 4 o'clock, on Thursday. The contract for the dinner was undertaken by no less distinguished a person than M. Alexis Soyer, who by this act would appear to have abandoned the Reform party in order to throw himself into the arms of the agricultural interest.

The banquet was one of the grandest affairs of the kind that it has ever been our lot to witness. The site selected was a piece of ground conveniently situated at the north end of Queen-street, a large portion of which was enclosed, and the pavilion erected in the centre. M. Soyer, the renowned *chef* of the professors of the culinary art, served up a repast which, whilst it fully justified the confidence reposed in him by the council, at the same time sustained the *chef's* well-earned reputation. Several new and exquisite dishes graced the table, and amongst them were French raised pies *à la Soyer*, spring *Magnanais* salad, and Soyer's pudding *à la Exeter*. Upwards of 1,200 persons partook of the entertainment, and the following was the general bill of fare:—

Baron with Saddleback of Beef
à la Magna Charta.

- 33 Dishes of Ribs of Beef.
- 35 Dishes of Roast Lamb.
- 99 Dishes of Galantine of Veal.
- 99 Dishes of Ham.
- 66 Dishes of Pressed Beef.
- 2 Rounds of Beef à la Garrick.
- 264 Dishes of Chickens.
- 33 French Raised Pies of Venison.
- 33 French Raised Pies à la Soyer.
- 198 Spring Mayonnaise Salad.
- 264 Tarts of Cherries, Gooseberries, Raspberries, and Currants.
- 33 Soyer's new Pudding (à la Exeter).
- 198 Dishes of Hot Potatoes.

Soyer's
Grand Trophy of Agriculture.

There was a special bill of fare for every thirty persons, the supply being repeated throughout the pavilion for each range of tabling occupied by that number of guests, as follows:—Ribs of beef, Exeter pudding, Mayonnaise salad, chickens, potatoes, ham, fruit pie, Mayonnaise salad, French raised pie of venison, galantine of veal, chickens, potatoes, fruit pie, ham, Mayonnaise salad, chickens, potatoes, slices of beef, Exeter pudding, saddle of lamb, Mayonnaise salad, chickens, potatoes, galantine of veal, fruit pie, Mayonnaise salad, slices of beef, French raised pie à la Soyer, potatoes, fruit pie, ham, Mayonnaise salad, chickens, Mayonnaise salad, Exeter pudding, ribs and breast of lamb.

The Marquis of Downshire, the noble president of the Royal Agricultural Society, took the chair at four o'clock precisely, amidst a general burst of cheering. He was accompanied by his excellency M. Droun de Lhuys, the French Ambassador; his Excellency the Hon. Mr. Lawrence, Minister from the United States of America; his Excellency the Hon. Mr. Reeves, American Minister to the French Republic; Mr. Van de Weyer, the Belgian Ambassador; the Mayor of Exeter, Mr. E. A. Sanders; the Earl of Yarborough, the Earl Fortescue, the Earl of Falmouth, the Earl of Feversham, the Earl of Ilchester, Lord Wodehouse; Sir J. Yarde Buller, M.P.; and Sir John Duckworth, M.P. The Earl of Chichester filled the vice chair, and at his table were seated Lord Wharncliffe, Viscount Anson; Mr. Viennot, secretary to the French embassy; Mr. Moffatt, M.P.; Lord Hastings, Sir W. B. Ffolkes, Lord Henniker; Sir Harry Verney, M.P.; Hon. Captain Howard, M.P.; Lord de Tabley, Sir John Duntze; and Mr. Christopher, M.P. Amongst the general company we observed the High Sheriff of the County, Mr. Arundell Yeo; Sir Bouchier Wrey, Sir Robert Newman; Mr. Buller, chairman of the Bristol and Exeter Railway; Mr. Woolcombe, chairman of the South Devon Railway; Mr. Thompson, chairman of the York and North Midland Railway; the Rev. Prebendary Ford, chaplain to the Mayor of Exeter, in academics; the High Sheriff of Exeter, Mr. Moore; Colonel Morris, Vice President of the New York Agricultural Society; Viscount Chetwynd; Sir T. F. Lewis, M.P.; Mr. Bremridge, M.P.; Hon. John Fortescue, M.P.; Mr. Deedes, M.P.; Mr. Newton Fellows, Mr. Cornwall Leigh, Sir T. E. Drake, Mr. Ker Seymour, M.P.; Captain Cotton, Lord Berwick, Sir J. Anson, Sir J. P. Boileau; Mr. Gwyn, M.P.; Baron de Ritzen; Sir T. Wheler; Mr. Vivian, M.P.; Hon. Captain Ager, Hon. F. Astley, General Shubrick; Hon. Captain Rushout, M.P.; Mr. C. R. Cotton; M. Kamensky, of St. Petersburg; Prince Gargarini; M. Morier, late Ambassador in Switzerland; Major Clark; Captain Wentworth Buller, R.N.; Rev. T. Kitson, Rev. — Golding, Mr. Bury, Captain Cox; Mr. Hamilton, M.P.; Mr. B. Fortescue, Mr. Mark Phillips, Mr. R. B. Sheridan, M.P.; Earl of Macclesfield; Mr. Clive, M.P.; the Duke of Cleveland, the Earl of Carnarvon, the Earl of Leicester, Viscount Ebrington, Viscount Courtenay, Viscount Hill, Lord Andover, Lord Bridport, Lord Ashburton, Hon. Mr. Bouverie, Hon.

Dudley Pelham, M.P., Sir John Kennaway, Bart., Sir T. D. Acland, M.P., Sir C. Lemon, M.P., Sir R. Price, M.P., Sir H. F. Davie, Sir M. W. Ridley, Sir Thos. Tancred, Admiral Hastings, Sir Montague Cholmeley, Mr. Marshall, M.P., Mr. Pendarves, M.P., Colonel Ferguson, Colonel Porter, Colonel Taylor, Captain Locke Lewis, Captain Cox, Mr. J. V. Shelley, Mr. Henry Wilson (Stowlangtoff), Mr. Miles, M.P., Mr. Pusey, M.P., Mr. Childers, M.P., Hon. H. W. Wilson, Mr. Mackworth Praed, Rev. H. Sanders, Rev. James Mules, Colonel Harding, Rev. J. F. Turner, Rev. W. H. Howard, Rev. John Cox (London), Rev. J. P. Sydenham, Mr. Ralph Barnes, Mr. Lewis William Buck, M.P., Mr. W. Pole Carew, the honorary secretary of the Local Agricultural Committee (Mr. C. Brutton), Professor Simonds, Professor Way, Mr. Edmund Clark, Mr. R. H. Clark, Mr. Hans Hamilton, M.P., Mr. Thomas Bernard, Mr. Edward Archer, Mr. Shaw (of London), Mr. R. Milward, Mr. C. H. Turner, Mr. T. R. Barker, Mr. H. Brandreth, Mr. Stephen Grantham, Mr. Samuel Druce, Colonel Austen, Mr. John Silliant, Mr. John Bennett Lawes, Mr. Jonas Webb, Mr. Samuel Bennett, Mr. Philip Pusey, M.P., Mr. W. Fisher Hobbs, Mr. Robert Smith, Mr. George Turner, Mr. W. Simpson, Mr. Richard Garrett.

The good things provided by M. Soyer having been discussed, and grace having been said by the Mayor's Chaplain, the Marquis of Downshire rose and proposed in succession "The Queen," "Prince Albert," "The Prince of Wales and the rest of the Royal Family." The noble president alluded in terms of appropriate reprobation to the late dastardly attack upon her Majesty, and also to the national loss sustained by the death of the Duke of Cambridge.

The toasts were cheered right loyally, and the Devonport Marine Band played the National Anthem.

The Marquis of Downshire again rose and proposed "The Foreign Ministers" (loud cheers). He felt proud and flattered to find that they were willing to receive these illustrious gentlemen in the manner he should wish, for he need not say how important it was to cultivate the relations of amity with all nations on the face of the globe (cheers). The illustrious individual who would respond to the toast would be the Ambassador from the French Republic. He was happy to say that that republic had not sent as her representatives to this country the least illustrious or the least talented of her sons. (Hear, hear.) And he called upon them to give him a true and hearty English welcome. (The toast was drunk with loud and protracted cheering.)

The FRENCH AMBASSADOR rose to return thanks, and was received with a roar of applause. He said—Mr. Chairman and Gentlemen, I beg leave, both in the name of my colleagues and in my own name, to return you our best thanks for your most cordial welcome. We respond with the feelings of gratitude so fully due to your kind reception (cheers). Though without any pretension to practical knowledge of the details of agriculture, I have the utmost esteem for its manly and useful pursuit (cheers). Even as a passing traveller through this delightful county, so aptly called the "garden of England," I have had leisure to admire the spirit and energy exhibited by your landlords and farmers, with the view of rendering the land increasingly productive in proportion to the increase of your population (cheers). I was struck with wonder at the sight of those alterations brought about through the labour of your experimentalists and the researches of your men of science. Whether I consider your superior breeding of stock, your improved implements of husbandry, your varied systems of cropping, your bold processes of draining and subsoiling, or your happy application of chemical discoveries for remedying the defect or adding to the natural

capabilities of your different soils—whether I behold around me your sturdy Saxon yeomen—(cheers)—yes, I say your sturdy Saxon yeomen and their blooming daughters—(renewed cheering)—well may I say never did Divine Providence grant a more promising land to a more deserving race (continued cheering). Once more I have the honour to return our thanks for your cordial hospitality, and I beg your leave to couple with the expression of those thanks a toast which, I am sure, will be received well by all of you—it is the toast of “Success to the Royal Agricultural Society of England” (reiterated cheering).

The AMERICAN MINISTER then rose, and was received with an enthusiastic welcome. He said—My Lords and gentlemen, I have had placed in my hands a toast, which I shall offer with very great pleasure, inasmuch as it relates to the great interests of this country and of all other countries, inasmuch as to me there is no want of harmony in those interests, if properly regulated (Hear, hear). Without touching upon any point that could give or would give the slightest umbrage or the least ill-feeling to any human being, I will, without further comment, announce to you the toast, at this moment. It is, “Agriculture, Manufactures, and Commerce” (cheers). A friend as I am to all those interests, and believing that the power and glory and interest of this country have been promoted by the encouragement of them all, I rejoice that agriculture is first (loud cheers). I came here not as a foreigner, I came here to claim relationship with you (Hear). I came here, for the first time in my life, to see the farmers of England with my own eyes (A voice, “Look at ‘em”) (laughter); believing that when I saw them I saw the backbone of England (renewed and enthusiastic cheering). I know too well the history of my ancestors and of my kindred in England not to know that the farmers of England have always been loyal and true to the Crown; I know their history too well not to know that the battles of England and the glory of England are owing to the patriotism, the power, and the sacrifices of the farmers of England (vehement cheers). I came here because my ancestors were all farmers, and English farmers too (Hear), and I came here as the representative of a country whose great national interests are those which are founded in the soil (loud cheers). I came here to pledge to you, and to offer to you in that kind and fraternal feeling which should exist between two great nations connected with each other by such enduring ties, the sympathies and the kind feelings of the great body of the farmers of the United States (loud cheers). I came here as their representative to tell you and to make you realize that they feel under great obligation to you for the experiments that you have tried, which we being young and not rich (laughter) are not able to try, while you have the capital, the skill, and what is more the science, which has been applied to the art in Great Britain (cheers). When I look to the state of your agriculture in 1850, and compare it with its state in 1820, I am perfectly amazed. I have been overwhelmed to-day—I have seen so much and heard so much that I hav’nt had time to digest it (laughter, and cheers). I have seen to-day that which I have never seen before. When I look back to this country only 30 years—and in the annals of time it is but a day—I look at a period when the average product of wheat was not more than from 20 to 22 bushels to the acre, and now all parties of all shades of political opinion agree that the average product is from 24 to 30 bushels to the acre (cheers). We of the United States have not the slightest jealousy of the agricul-

tural interest of England (a laugh). We rejoice in every new agricultural improvement you bring out suited to your condition. We rejoice when we hear that through the application of agricultural chemistry you can produce another spear of grass in this kingdom. It has been said very truly that he who produces two blades of grass where one grew before is a public benefactor. I agree to that. If that be true, you are all public benefactors, because you are increasing the productiveness of your country. It is a matter for you and not for me to decide upon those great questions that agitate this country now; for I did not come here to enter into the political discussions of the British people. I may be allowed to have my own opinions, but those opinions will never be expressed in Great Britain, so far as regards the internal policy of Great Britain. But I can tell you that the more food you produce, and the nearer you come to provide a supply for the whole of your population, the more rejoiced I shall be and the country I represent. In regard to commerce there is not a man within the sound of my voice, I apprehend, who will not agree with me when I say that commerce, or navigation, or trade, or whatever name you may choose to call it, is essential to the prosperity of the agricultural interest (cheers). Commerce has been the great pioneer of civilization; and what country has done so much as this to civilize the world through the instrumentality of commerce? (cheers.) I wish to do perfect justice to all interests, for I believe they are all in harmony. In regard to manufactures it would be idle, futile, and foolish for me not to acknowledge that the manufactures of England—the spindles of England, if you please—have, in conjunction with this great, powerful, and patriotic body of men, the agricultural interest, fought the battles of Great Britain (cheers). To me there appears no discrepancy whatever in maintaining that all these interests are vital to the prosperity of this nation. In all great nations I believe these three interests are identical. It is for you to decide, and not for me, how far you may be willing to be independent of foreign nations for food (Hear, hear). That is a question that belongs to the English political casuist, and not to a man representing a great nation on the other side of the Atlantic, which is a great producer of food. That is a question I shall not touch upon. It would not become me. I did not rise for the purpose of expressing opinions in regard to the internal policy of this great nation; but I tell you that I should deem it a misfortune to my own country and to the world if, by anything, whether by the act of our own legislature or from any other cause, this mighty nation, Great Britain, should lose any portion of its power in the family of our nations (loud and repeated cheering). There is room for us all (Hear, hear). I desire to see competition among liberal—in fact, among all nations—but I desire most to see a competition existing between the old Anglo-Saxon and the young Anglo-Saxon (cheers). But let that competition be upon the principle—which of us shall most advance and diffuse civilization throughout the world? which of us will extend justice to feebler nations than ourselves—education, religion, the bible? (protracted cheering). Let that competition be this. Let us see which nation will do the most good (repeated cheering). I am happy to state that the United States is not represented alone by me on this occasion. I have on my right one of the most distinguished statesmen and, what is better, one of the greatest and best farmers of the Union. That gentleman is the American ambassador at Paris, who has come here to meet you this day—his Excellency William C. Reeves, of Virginia. Nor are Mr. Reeves and myself the only representatives of the United States. In this room certainly—but in the vast assembly I cannot point out the precise spot—is a gentleman, one of the greatest farmers

and stock growers of the Union, from the province of New York, Col. Morris, vice-president of the New York Agricultural Society, a gentleman who has been purchasing the stock of England very largely, that we in the western world may improve our own (cheers). Whatever you may think of your cousins on the other side of the Atlantic, I can only state to you, as their representative, that they are proud of their origin, and rejoice that they are descended from Englishmen (cheers). I hope at no distant day, going on as we are at the rate of a million a year in our population, and we rejoice that we do increase, for we have room enough, and food enough, and labour enough for all—I hope at no distant day that we, your humble cousins, shall return to you, the farmers of England, to some considerable extent—(it must be done by instalments (a laugh)—the great debt we owe you in the agricultural line for the improvements you have made, for the instruction we have received, and for the great benefits our whole country has derived from your experience. I beg to thank the president and council for the opportunity afforded me to-day of being in this old Roman city of Exeter (cheers), and in this renowned county of Devonshire, distinguished for its rich red soil, its beautiful red cattle, and, in olden time, for its fine red cloaks (cheers), celebrated in poetry as well as in prose. It is renowned as the birthplace of that great and mighty man, Sir Walter Raleigh, the man who first went to the country of my illustrious friend Mr. Reeves, a man whose name renowned in history will live as long as England exists. But before I sit down I must offer my thanks, as an humble individual, to the inhabitants of the city of Exeter. Wherever these annual exhibitions may take place, I think you will be fortunate if you find a city presenting so much neatness, so much simplicity, so much taste, and so much cheerfulness that one feels at home the moment he enters it (cheers). It is the first time I have ever set my foot in the county of Devon. I can only say I am indebted to the kindness of—I do not know what to call him (laughter); he is a general philanthropist, engaged in every good and great work—Sir Thomas Acland (applause). I believe it is to Sir Thomas I am indebted for the privilege which I enjoy this day. I am certainly indebted to him for his hospitality in entertaining me and my friends yesterday, last night, and to-day. And on the part of myself, of my country, and my countrymen who are now present, I feel under the deepest obligation to the Royal Agricultural Society of England for the opportunity afforded us of being here. I have said it is the first time I have ever set my foot in Devonshire—I hope it will not be the last (loud and long-continued cheering).

The Earl of CHICHESTER, in introducing the next toast, apologized for the circumstance of his filling an office which should have been occupied by the Duke of Richmond, whom he was sure nothing would have kept away but a strong sense of duty to discharge important engagements elsewhere. He had to propose to them "The Health of the Mayor and Corporation of the City of Exeter" (loud cheers). From the municipalities of many of our ancient towns and cities the Royal Agricultural Society had met with friendly and hospitable reception, but they were all surpassed by that with which they had been honoured by the loyal and respectable citizens of Exeter and their worthy mayor (cheers).

The MAYOR of EXETER returned thanks, and expressed a hope that when the visitors who had honoured the old city with their presence returned to their homes, they would do so with the conviction that there was in Devonshire a fair proportion of good farmers—that they had a breed of cattle of which any county in England might be proud (cheers)—and that the farmers of Devon were striving to profit by the advantages with which a

gracious Providence had seen fit to bless their county (loud cheers). He could assure the meeting that the wish on the part of the inhabitants of the city and county was unanimous for the prosperity of the Royal Agricultural Society of England.

LORD WODEHOUSE rose and said, In rising to propose to you a toast, I throw myself upon your indulgence, both because I am entirely a stranger here, and because I feel at how great disadvantage I follow the eloquent speeches of the French Ambassador and the American Minister. My only claim perhaps on your attention is, that I come from the county of Norfolk, which has not been backward in agricultural improvements (Hear). But I need make no apology for my subject, the mere mention of which will ensure it a hearty welcome; it is "The Labouring Classes" (loud cheers). It is at all times a subject for grave reflection. If we would approach it aright, we must approach it with mingled feelings of hope and fear—hope, that by the discoveries of science and the rapid march of civilization, the labourer may reap a large share of the general improvement; fear, lest poverty should only appear the more afflicting when contrasted with more splendid riches and more exquisite refinement, and lest the rapid accumulation of wealth, if unaccompanied by its fair distribution amongst all classes (Hear, hear), would appear to mock, as it were, the never-ceasing toil of the labourer, who has borne so large a share in its production (loud cheers). But if at all times we must reflect deeply on this, above all in this great country—the first industrial nation in the world—above all at this meeting, the festival of agriculture, the first of industrial pursuits—above all at this period, when there has been, and is so great a ferment among the working classes in so many countries in Europe, the importance of which must not be estimated only from its open manifestations, but from the undercurrent of opinion, which may, for aught we know, be preparing results on which it would be idle now to speculate. I will endeavour then to touch on some few of the topics which may occur to me. Now, there is one circumstance in the condition of our labouring classes almost peculiar to this country. In other countries there are a vast number of peasant proprietors—in France, for instance, and in part of Germany; but in this country the condition of labourers for hire is the general condition of the labouring population. I do not wish or expect this state of things to be changed; I accept it as the settled condition of our labourers, and it has at least this advantage, that it is most favourable to production on a large scale; but it is obvious that in this state of things, in which society is almost divided into two camps—the employers and employed—difficult questions must arise. I am sure all here will agree with me, that it is not by lowering the height, but by raising the depth, of society that the labourer's condition must be advanced. Among the means for effecting this I set a high value upon education (Hear). I quarrel with no man's opinions. Would to heaven we could merge our differences, and cordially co-operate in the great end; but whatever be the best system, I am sure that education is not only a powerful engine for good, it is a necessity in the present state of society. Some may say education does not enable a man to drive a plough or hoe a field of wheat any the better. I grant you mere book learning is of little avail, but education in its true sense—that of training the mind, of drawing out its capabilities—is of the highest importance; it enables the labourer to reject bad advice, and to reject delusive though seductive theories, which would lead the uneducated man an easy captive. But these effects are a work of time—habits of providence, the great object, are not established in a moment. A new generation must spring up, trained to new ideas, before any great result can be

looked for. But I may be told mental training is all of no avail unless the physical condition of the labourer is improved. You may point to the insufficient accommodation of their cottages, their insufficient wages, and too often insufficient food, the impossibility of sparing sufficient time for education from their hours of labour, the necessities of their family compelling them to labour in the fields almost from their infancy. These, no doubt, are great evils, but there are remedies (Hear). The improvement of the dwellings of the labourers is of great importance (cheers). Having visited a considerable number of cottages in different parts of the country, I have found, I regret to say, that in too many cases cottages are badly constructed, badly drained, and badly ventilated. Often families are crowded together in a manner utterly regardless of decency and cleanliness (Hear, hear). But is there not a spirit of improvement abroad? We can point to many instances of landlords who are improving their cottages; we can point with satisfaction to the papers and essays on this subject, which have appeared in the Journals of the Agricultural Society, suggesting practical plans for their improvement. We must begin at the right end, for the labourer's character is formed by his own fireside; and if habits of decency, of order, of cleanliness, of self-respect are wanting there, it is in vain to expect to produce any effect by means and influences which can never contend on equal terms with those domestic influences, which in spite of a man's self, ingrain themselves into his very nature (Hear, hear). There is one other subject connected with the condition of the labourer, that has of late occupied so much public attention, that it would be unpardonable if I were to pass it over altogether without notice—I mean emigration (Hear, hear). I have, I confess, little faith in any great government national scheme of colonization. I fear it would speedily degenerate into a great government job. I am no friend to any scheme for what has been contemptuously and justly styled the shovelling out of paupers. I do not believe that, upon the whole, there is an over-supply of labourers in this country; but there is a congestion in some places, and I am convinced any plan is of great value which may enable the enterprising labourer to emigrate to colonies such as the Australian colonies, where he may attain an independence and competence which he could never hope for in an old and thickly-populated country (cheers). Bring together the demand for labour of these colonies with our over-supply, and you will confer an inestimable benefit on the labourer, an incalculable benefit on the colony, and upon every interest in this country, by enabling the colonies to send in larger supplies of their raw material for our manufactures, taking in return a larger quantity of our goods, and causing thereby a greater demand for agricultural produce to feed our manufacturers (cheers). I have already trespassed too long upon your attention; but whatever be your opinion, do not fall into the error of supposing that these are only questions for political theorists or amateur philanthropists; they are practical questions, deeply interesting all classes of producers. Who can estimate the mere money value to all producers of intelligence and trustworthiness on the part of the labourer—of friendly relations and community of interests between the employer and employed? I am convinced the employer of labour may do much to advance the condition of the labourer; but, after all, his improvement will come from himself. I am confident that our labourers have that good sense and good feeling which will always attach them to the cause of order and the maintenance of our institutions; but, at the same time, they have the characteristic energy of Englishmen, which will make them eagerly embrace,

and perseveringly carry out, every national plan for their social advancement (loud cheers).

The Earl of YARBOROUGH, in proposing the next toast, alluded in terms of admiration to Lord Wodehouse's speech. If anything were calculated to make the society universally respected, it would be such a speech as that (loud cheers). Its sentiments he knew were felt by the farmers, but they had never before had the good fortune to find any one to expound them so well (Hear, hear). He had had the privilege of attending many meetings of the society, but he recollected none of greater importance than the present (cheers). Having said thus much of this part of the proceedings, they would allow him next to refer to another great object which its members had in view—namely, to show in the different parts of England what were the most likely means of enabling the farmer to produce his meat and corn at less expense and in greater quantities; and standing there in that particular district, he should certainly be acting most disingenuously if he did not say at once that the land was capable of very great improvement (Hear). He trusted that by this visit of the society to the West of England great good would be effected. It was not to be supposed, however, that the mere exhibition of agricultural implements for two days could accomplish this. The exhibition brought together the farmers of various parts of the country, who were thus enabled to compare notes, and instruct one another in the uses and advantages of these implements (Hear, hear). He had observed on this occasion, and he said it with regret, that some of the implements which had been shown as new implements could scarcely be so regarded. They were merely improvements, and he should fail in his duty to the society if he disguised from them what he felt. He might be wrong; but he thought that some of the implement makers were rather too fond of claiming credit for a new implement where it had simply been altered, and the alteration had been made to enable it to receive a prize (Hear, hear). He mentioned this because he felt that it was of very little use to ask a member of the society to address them unless he was permitted to tell them what he thought (cheers). But they had had animals as well as implements exhibited at this meeting. And who had come to see them? Why they found amongst them Americans, Frenchmen, and persons from all parts of Great Britain, and considering the very long distance that some of the stock had been brought, he was of opinion that they had had a most successful exhibition (Hear, hear). He said this comparing it with former ones (Hear, and cheers). But further, at no previous meeting had been exhibited a more noble specimen of the human being than was to be found in their president (cheers). I tell you (said Lord Yarborough) that he would handle well; and I beg leave to propose his health, with thanks to him for the manner in which he has presided over the society. It is of the greatest importance to this society, and to the farming community of England; and being important to us, it is equally important to the whole country that this society, if it is to do good, should be presided over by one who will command the respect and esteem of the farmers (cheers). I call upon you, therefore, to drink "Lord Downshire's Health," which I know you will do in a right cordial and hearty manner (loud cheers).

The toast was received with three times three, and one cheer more.

The Marquis of DOWNSHIRE, after returning thanks for the honour which had been conferred upon him, and expressing a hope that he had deserved it, proceeded to say—My noble friend, Lord Yarborough, has been pleased to be facetious at my expense; but addressing myself especially to the hunting part of the company,

and recollecting what fell from Colonel Challoner on a former occasion, I would say, is it not a very hard case to be publicly taxed twice in one year with walking 17 or 18 stone? (laughter and cheers.) My noble friend has been kind enough, not only to touch upon my size, but upon my "points" (great laughter). He never ventured to handle them, however (loud cheers, and renewed laughter). He said, "Your noble president for this year will 'handle well.'" All I can say is, that he is at perfect liberty to do that; but let him recollect, though I am not fond of quoting Latin after dinner, that if he does, *Nemo me impune lacessit* (much laughter and cheers). Still I am really and truly obliged to my good old friend for having spoken so kindly of me. The noble marquis then observed that he felt deeply gratified at the magnificent show which he had witnessed that day, and which he thought proved much for the success of the society. Considering the numbers exhibited, he was of opinion that it had by far exceeded the show of any previous year; and when he remembered the distance of the city of Exeter from the more fruitful breeding counties, he conceived it to reflect the highest credit upon those breeders who had thought it worth their while to bring their stock such distances from their homes. He was not then about to obtrude his opinions with regard to the stock shown that day; but he would take the liberty of saying that the reception which the citizens had given to the Royal Agricultural Society, individually and collectively, was such as no one had a right to calculate upon (cheers). He deeply felt the honour that had been done to the society, and begged to assure the mayor and inhabitants that he had come down to Exeter with the confident expectation that the meeting would be a pleasant one. In that expectation they had not been disappointed; and when they should leave that fine old city it would be with a sentiment of regret that their intercourse had been of so brief a duration (cheers). He would say no more, but wish them all success, health, and happiness (reiterated plaudits).

Mr. SILLIFANT, of Coombe, gave "The Judges of Live Stock and the Judges of Implements" (cheers).

Mr. CHAMBERLAIN returned thanks for the judges of stock, and in allusion to the subject of education, so ably spoken upon by Lord Wodehouse, said that he should like to add a rider to the noble lord's address. When they heard of so much being done to improve the education of the children of the poor, not only in large towns, but in villages and workhouses, was it too much to hope that some plan might be adopted by which the children of the smaller tenant-farmers might be educated also? (cheers.) There were no means of doing this that he could think of but proprietary schools, to be established by the large proprietors, at which the children of the tenantry might be boarded and educated at sums within their parents' means (loud cheering). He did not mean to say that colleges should be provided, but such an education as should fit them to occupy the situations in which they were placed (cheers).

Mr. LISTER acknowledged the toast on behalf of the judges of implements, and expressed his satisfaction at the immense improvements which had of late been made in the methods of testing implements. If they had not made some advances of this kind three or four years ago, the prospects of the society must have been greatly shaken under the present difficulties of the farmer (loud cheering). Lord Wodehouse had talked of educating the poor, and his friend Mr. Chamberlain of educating the sons of the tenant-farmer; but if the landlords would excuse him he must say that they, too, wanted educating (loud and long-continued cheering). He (Mr. Lister) had always found when the landlord understood his business that he was a kind and considerate landlord (loud cheers). If they had but remunerating prices

they could employ double the amount of labour in Yorkshire, Northumberland, Cumberland, and Westmoreland, and if they wanted better farming they must employ more labourers (cheers). What did emigration do but send away the very sinews of our labour? (cheers.) For his part he was of opinion that there were lands enough to keep the labour of our own country at home (cheers).

Mr. REEVES (the American Minister to the French Republic) was then introduced to the meeting, and proposed "The Highland and Agricultural Society of Scotland, the Royal Agricultural Improvement Society of Ireland, and other agricultural societies." In doing so the hon. gentleman said that, having come there in an unofficial and unaccredited character, he had no right to expect the very distinguished honour which had been conferred upon him by their noble president. But he would take the liberty of saying that, if a hearty and an unaffected sympathy in their noble pursuits—if an ardent and constant admiration of British energy, sagacity, and enterprise were any qualifications for proposing a toast in honour of the Agricultural Societies of Scotland, of Ireland, and of other parts of the British dominions, he was not altogether without some pretensions to perform the part which had been allotted to him (cheers). After the warm and fraternal reception which he had met with amongst them, he trusted he might be permitted not to consider himself a stranger (Hear, hear). He had never been able to understand why—in a moral sense, at least—the citizens of the United States should be considered as foreigners or strangers upon British soil (cheers). They could not, it was true, say—

"This is our own, our native land;"

but they could certainly say that it was "next of kin;" for it was the land of their forefathers (loud cheers). It was the land of their mother tongue. It was the land whose religion (loud cries of "Hear"), whose literature, whose laws, and whose institutions they had inherited (renewed cheers). Nay, more he would say, that they claimed a sort of inheritance in its very soil. They had that which, at least, might be called the moral and intellectual usufruct of it, for there was not a spot upon the surface of this noble island in which family traditions and personal associations, as well as historical recollections, did not give to each one of them an immediate individual interest (loud cheers). England had many glorious and solid titles to the honour and the admiration of the world. As her greatest poet had said—

"She is an old and haughty nation, proud in arms."

Her navies rode triumphant upon every sea—her imperial capital was the Rome of the modern world—her commerce visited and carried on its system of universal exchanges with the remotest extremities of the habitable globe—"her workshops clothed the naked nations." But he frankly owned that, with all that was great in her military and commercial annals, there was something in her georgics which filled him with still stronger admiration (loud and protracted cheering). It was his firm belief that the pride and glory of England were to be found in that noble agriculture which, whilst it had improved the race of their useful animals, had almost multiplied the fruits of the earth to an extent of which he could not form a conception until he saw with his own eyes that day the prodigies which had been effected (great applause).

Sir ROBERT PRICE, M.P., gave "The health of the Duke of Richmond, the President-elect" (cheers).

The Earl of CHICHESTER returned thanks on behalf of the noble duke, whose absence he could assure them was solely the result of an unavoidable necessity.

The proceedings of the festival terminated with the

toast of "The Railway Companies, and thanks to them for the facilities they have afforded to the Society," which was given from the chair.

The company then retired.

CATALOGUE OF IMPLEMENTS EXHIBITED AT THE SHOW.

CHARLES PHILLIPS and Co., of the Baptist Mills Iron Foundry, Bristol.

A turnip cutter, invented by Charles Phillips, and manufactured by the exhibitors; (new implements) two turnip cutters, invented by Charles Phillips, and manufactured by the exhibitors; a turnip cutter, invented by the late Mr. James Gardner, of Banbury, and manufactured by Mr. B. Samuelson, of Banbury; and (new implement) a cast iron grate, invented by Charles Phillips, and manufactured by the exhibitors.

ROBERT HARRIS, of Braunston, near Daventry, Northampton.

A cultivator, grubber, and scarifier, invented and manufactured by the exhibitor.

STRATTON, HUGHES, and Co., of Bristol.

Three plain sided one horse carts, with $2\frac{1}{2}$ inch wheels, iron stocks, and iron axles, invented, improved, and manufactured by the exhibitors; an agricultural cart, with bent shafts, fixed drizzle boards and wheels, with $3\frac{1}{2}$ inch convex tire, invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors; a meal cart, for the delivery of corn or flour in sacks, improved and manufactured by the exhibitors; a cranked axle spring cart for carrying bullocks and other live stock, invented, improved, and manufactured by the exhibitors; an improved single horse Scotch spring cart, for general farm purposes, improved by the late Mr. R. Stratton, of Bristol, and manufactured by the exhibitors; a cranked axle tipping manure cart, with hay ladders, and spare liquid manure body, invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors (medals of the Royal Agricultural Society were awarded for this cart at Derby in 1843, at Southampton in 1844, and at Northampton in 1845); a light agricultural cart, with fixed wings or drizzle boards, improved and manufactured by the exhibitors; an improved farm cart, with bent shafts and head and tail ladders, invented, improved, and manufactured by the exhibitors; two single horse harvest carts, with $2\frac{1}{2}$ inch wheels, invented by J. Haunum, Esq., of Burcot, improved by the late Mr. R. Stratton, of Bristol, and manufactured by the exhibitors (a silver medal of the Royal Agricultural Society was awarded for this cart at Southampton in 1844); a single horse harvest cart, with narrow wheels, and a manure cart body and shafts, invented by John Morton, Esq., of Whitfield, and manufactured by the exhibitors; a patent wrought iron cart, invented, improved, and manufactured by the exhibitors; a strong full sized Wiltshire farm wagon, with narrow wheels, improved and manufactured by the exhibitors; a straight raved wagon, with removable head and tail ladders, and 6-inch wheels, invented by Mr. R. Stratton, and improved and manufactured by the exhibitors; a meal or corn delivery wagon, improved and manufactured by the exhibitors; a tipping wagon, with patent iron wheels, invented by P. B. Purnell, Esq., of Stancombe Park, Dursley, improved by the late Mr. R. Stratton, of Bristol, and manufactured by the exhibitors; a straight raved spring wagon, with portable driving seat and patent oil box axles, with screwed caps, invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors (the prize of £20 was awarded for a wagon of this form at the Derby meeting of the Royal Agricultural Society in 1843); a one horse flour or meal wagon, with narrow wheels, improved and manufactured by the exhibitors; (new implement) a plain sided straight raved wagon, with open wings at the sides, and 4-inch wheels, invented, improved, and manufactured by the exhibitors; four patent large sized tumbler carts, marked A., C., E., and H., invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors; (new implement) a cylindrical solid and liquid manure cart, and (new implement) a watering cart and liquid manure distributor, in-

vented, improved, and manufactured by the exhibitors; three registered cylinder carts for water and liquid manure, invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors; four Norwegian harrows and clod crushers, with iron bodkins and wooden shafts, invented by G. E. Frere, Esq., of Roydon, and improved and manufactured by the exhibitors (received the Royal Agricultural Society's prize of £10 at Shrewsbury in 1845, the prize of £5 at Newcastle in 1846, and the prize of £5 at Norwich in 1849); four sets of four patent wrought iron wheels, of different sizes, a set of four patent wrought iron beer dray wheels, and a pair of strong wrought iron cart wheels, 4 feet 4 inches high, with tire 4 inches by $\frac{3}{4}$, invented, improved, and manufactured by the exhibitors; specimens of Stratton, Hughes, and Co.'s patent hollow wrought iron, invented by Benjamin Stratton, of Bristol, and manufactured by the exhibitors; a Read's patent subsoil plough, with Stratton's patent wrought iron beam, invented by the late Mr. John Read, of Regent-circus, London, and improved and manufactured by the exhibitors (awarded the prize of £10 at the Royal Agricultural Society's Meeting at Southampton in 1844, also the prize at Shrewsbury in 1845, at Newcastle in 1846, and at Northampton in 1847); a Read's patent subsoil plough, fitted with removable grubbing tines, invented by the late Mr. John Read, of Regent-circus, London, and improved and manufactured by the exhibitors; (new implement) a Read's subsoil plough, with a dirt board or elevator, for more completely mixing the subsoil with the surface soil, invented by Mr. John Read, of Regent-circus, London, improved by the Marquis of Tweeddale, and manufactured by the exhibitors; three patent wrought iron ploughs, fitted as swing ploughs, and (new implement) a wrought iron bill side plough, with the beam of Stratton's patent hollow wrought iron, improved and manufactured by the exhibitors; a wrought iron cultivator, with framework of Stratton's patent hollow wrought iron, invented by the right hon. Earl Ducie, of Tortworth, and improved and manufactured by the exhibitors; a pair of hard wood wheels for use in tropical climates, a pair of wooden cart wheels, 4 feet 10 inches high, with tire $2\frac{1}{4}$ inches by 9-16ths, three pair of strong cart wheels, a pair of wheels, 5 feet 6 inches high, with tire 4 inches by $\frac{3}{4}$, with ash felloes, hard wood spokes, and iron stocks, and 22 pairs of cart wheels of different sizes, improved and manufactured by the exhibitors; a pair of iron naves, fitted with axle arms, and two pair of oil box iron naves, fitted with long bolts and axle arms, invented by the late Mr. R. Stratton, of Bristol, and improved and manufactured by the exhibitors; a portable liquid manure pump, with stand, invented, improved, and manufactured by the exhibitors; a five tined and a seven tined Gloucestershire cultivator, invented by Finlaison, and improved and manufactured by the exhibitors; a moulding and hoeing plough for ridge work, improved and manufactured by the exhibitors; an oat crusher, with parallel grooved rollers, a line-seed mill on iron frame, with parallel grooved rollers and double handles, a malt crushing mill on iron frame, with smooth rollers, a bean splitting mill on iron frame, with parallel grooved rollers, coarsely cut, a pair of oat crushing rollers, adapted for working in either of the preceding mills, a pair of linseed rollers, adapted for working in either of the preceding mills, a pair of malt rollers, adapted for working in either of the preceding mills, a pair of bean rollers, adapted for working in either of the preceding mills, and two improved two-knife chaff engines of different sizes, with mouth piece and double handles, invented, improved, and manufactured by the exhibitors; an improved double lever cheese press, and an improved rack and cheese press, improved and manufactured by the exhibitors; a double cheese press, with compound leverage, invented by Mr. W. J. Gingell, of Bristol, improved and manufactured by the exhibitors (to this cheese press was awarded a premium of £5 by the Royal Agricultural Society at Bristol, and a medal at Derby); an improved one row carrot and general purpose drill, with seed box and manure box, and an improved one row carrot and general purpose drill, invented by E. H. Clarke, Esq., of Shepton Mallet, improved and manufactured by the exhibitors; a patent treaded spade, a patent shovel, a patent treaded shovel, a patent casting tool, 13 by 6 $\frac{1}{4}$ by 6 $\frac{1}{2}$, a patent navigator's shovel, a patent marsh spade, a patent Devonshire miner's shovel (bright), and a patent square miner's shovel (bright), (new implements) several sets of patent draining tools, for pipe draining, consisting of patent bottoming tools, patent grafting tools, patent Hampton shovels,

patent hoes, and patent pipe layers, (new implements) a set of five patent draining tools, for strong and clay lands, several patent scoughing tools of different sizes, a patent bottoming tool (new implement) three patent square Hampton shovels, a swan neck hoe, (new implement) an improved solid cast steel manure fork, with three round prongs, solid neck, and long straps, (new implement) an improved solid cast steel manure fork, with four round prongs, solid neck, and long straps, (new implements) several improved manure forks, (new implement) an improved solid cast steel potato fork, with solid neck and long straps, (new implements) several improved solid cast steel digging forks, with square and triangular prongs, (new implements) two sets of improved solid cast steel hay forks, with sweeps (bright), (new implement) a set of improved gentleman's garden tools (bright), an iron digging fork, with square prongs (black), and an iron digging fork, with triangular prongs and flat points (black), (new improved, and manufactured by W. A. London, of Birmingham; (new implements) two pair of patent hand dibbles for wheat and other seeds, invented, improved, and manufactured by Jesse Ross, of Leicester; and a stand of models of carts, waggons, coburgs, and agricultural implements.

WILLIAM CROSSKILL, of the Beverley Iron Works, near Beverley, Yorkshire.

Several patent serrated rollers or clod crushers of different sizes, invented, improved, and manufactured by the exhibitor (awarded a prize of £20 and silver medal at Southampton, £10 at Shrewsbury, and the special award of a gold medal at Newcastle); four different pairs or sets of patent cart wheels and axle, invented, improved, and manufactured by the exhibitor; a set of patent cart wheels and axle, invented, improved, and manufactured by the exhibitor (awarded a medal at the Derby meeting, and a medal for further improvements, at the Newcastle meeting); several different sets of patent cart wheels and axles, invented, improved, and manufactured by the exhibitor; several sets of patent waggon wheels and axles, invented, improved, and manufactured by the exhibitor; a pair horse waggon and truck, and two improved pair horse waggons, improved and manufactured by the exhibitor; a one horse harvest cart, invented by J. Harnam, Esq., of Burcot Park, Oxon, improved and manufactured by the exhibitor; an improved Scotch cart body, an improved Norwich cart with harvest raves complete, a one horse Norwich cart and harvest cart, and an improved one horse cart and harvest cart, improved and manufactured by the exhibitor; a Torr's one horse ring cart, improved by the exhibitor and Wm. Torr, Esq., of Aylesby, and manufactured by the exhibitor; a Shrewsbury one horse cart, with self acting tail board (which received a prize of £2 at the Shrewsbury meeting); a one horse cranked axle spring cart, and a Newcastle model one horse plank cart and harvest cart, improved and manufactured by the exhibitor (this cart received the head prize at the Newcastle meeting); an Eaton's patent York one horse cart or harvest cart, invented by John Eaton, of Woodford, and improved and manufactured by the exhibitor (awarded the prize of £5 at the York meeting); an improved Scotch cart or harvest cart, an improved slotted and light one horse cart, a nag horse light cart, and a nag or pony cart, improved and manufactured by the exhibitor; two improved iron liquid manure carts or distributors (awarded a medal at Cambridge), and an improved night soil or town cart, invented, improved, and manufactured by the exhibitor; a fixture iron pump, with twelve feet of iron pipe and winbore, a portable liquid manure pump, with ten feet of hose pipe, &c., a fixture iron pump, with twelve feet of iron pipe and winbore, and a portable liquid manure pump, with ten feet of hose pipe, &c., improved and manufactured by the exhibitor; a tripod portable pump, stand, and plate, invented, improved, and manufactured by the exhibitor; an extra size portable liquid manure pump, with ten feet of hose pipe, &c., and a drag harrow or Uley cultivator and scarifier, invented by Mr. John Morton, of Whitfield, improved by Mr. Richard Clyburn, of Uley, and manufactured by the exhibitor; an improved Norwegian harrow, improved and manufactured by the exhibitor (awarded the head prize at the York meeting); a broadcast portable manure drill or distributor, for sowing soot, lime, salt, ashes, guano, &c., invented, improved, and manufactured by the exhibitor (awarded the prize of £10 at Northampton, and the head prize of £5 at Norwich); an archimedian root washer, invented by Captain Carr, of Tuschenbeck, Germany, improved and manufactured

by the exhibitor (awarded the silver medal at the York meeting); and archimedian bean washing machine, improved and manufactured by the exhibitor; a Yorkshire double action turnip cutter, improved and manufactured by the exhibitor; a patent iron fixture pig trough, invented by William Torr, Esq., of Aylesby, improved and manufactured by the exhibitor; a portable farm railway, improved and manufactured by the exhibitor (awarded the silver medal at Norwich); a set of railway trucks, invented and manufactured by the exhibitor, and improved by Thomas Fyson, Esq., of Barningham; a set of ironwork for a 15 feet or single length of 15 cwt. portable railway, and a set of iron wheels and axles for a railway truck, improved and manufactured by the exhibitor; a permanent and portable farm railway, for road and field work, to carry 40 cwt. loads, and a double set of points, curves, and connecting railway, invented, improved, and manufactured by the exhibitor; a train of railway trucks, a set of ironwork for one 15 feet length of 40 cwt. railway, a set of iron wheels and axles for one railway truck, a double length of permanent road railway to carry four ton loads, a set of ironwork for one 15 feet length of 80 cwt. railway, a two horse power portable thrashing machine, an improved straw shaker, a four horse improved thrashing machine, a four horse improved bolting machine, and an improved corn dressing machine and blower, improved and manufactured by the exhibitor; (new implement) an improved patent grinding mill, invented and improved by Wm. Crosskill and Co., of Beverley, and manufactured by the exhibitor; (new implement) an emigrant's flour dressing machine, improved and manufactured by the exhibitor; (new implement) an improved patent two horse power grinding mill, (new implement) an improved patent two horse power bone, gorse, &c., mill, (new implement) an improved patent four horse power mill, and (new implement) a patent two horse driving power, invented and improved by Wm. Crosskill and Co., of Beverley, and manufactured by the exhibitor; an iron sack barrow, manufactured by the exhibitor; and (new implement) a Yorkshire horse hoe, invented and improved by Thomas Young, farmer, of Aike, and manufactured by the exhibitor.

CLAYTON, SHUTTLEWORTH, and Co., of Lincoln.

A three, a five, a seven, and an eight horse power portable steam engine, improved and manufactured by the exhibitors; a pair of portable mill stones driven by steam power (this grinding mill received the prize of £10 at the Royal Agricultural Society's meeting at Norwich in 1849), a portable thrashing machine permanently fixed upon four wheels, and a portable circular saw and bench, invented and manufactured by the exhibitors.

F. McNEIL and Co., Patent Felt Works, Bunhill-row, Finsbury, London.

The patent asphalted felt for roofing houses and every description of farm buildings, for lining damp walls, particularly of granaries, and the floors of granaries, as vermin will not touch it; a rick stand of very cheap construction, and an excellent check to vermin, invented by J. F. Williams; and models and specimen framings, illustrating various cheap constructions of roofs for the application of the felt, also showing its use for ceilings, lining damp walls, covering flats, &c.

EGERTON HARDING, of Oldsprings, near Market Drayton, Shropshire.

A set of pair horse whippetrees (obtained a silver medal at the meeting of the Royal Agricultural Society of England at Newcastle upon Tyne), a one horse cart, and a pair horse cultivator, invented and manufactured by the exhibitor.

RICHARD HORNSBY and SON, Spittlegate, near Grantham, Lincoln.

A drill machine for corn and general purposes (this drill received the prizes of the Royal Agricultural Society of England, at Norwich, £15, July 1849; York, £15, July 1848; Newcastle upon Tyne, £15, July 1846; at the subsequent trial of drills at Pusey, October 1845, £15; Derby, £10, July 1843; Bristol, £30, July 1842; and at Liverpool, £25, July 1841), a ten coulter corn and seed drill, a six row drill for turnip seed, mangel wurzel, and manure (this drill received the prize of £10 of the Royal Agricultural Society of England, at the subsequent trial of drills at Pusey, October 1845, and at Norwich, July 1849, £10), a turnip seed, mangel wurzel, and manure drill, for 2 rows upon ridges, and 3 rows on the flat (this drill

had the prize medal awarded to it at the Royal Agricultural Society of England meeting held at Norwich, July 1849; £16 at York, July 1848; also £10 at the subsequent trial of drills at Pusey, October 1845), a three row drop drill for turnip seed and mangel wurtzel, a machine for distributing guano, soot, &c., broadcast, a drill for small occupation, an improved registered corn dressing machine (this machine received the prize of £10 from the Royal Agricultural Society of England held at Norwich, July 1849; £10 at York, July 1848; and £3 at Newcastle upon Tyne, July 1846), a nine horse power improved portable steam engine (the prize of £50 was awarded for this engine at York, 1818), a five horse power improved portable steam engine, a four horse power portable thrashing machine, a double cake breaker (this machine had the prize of £5 awarded to it at the meeting of the Royal Agricultural Society of England held at Derby, July 1843; £5 at Southampton, July 1844; and £3 at Shrewsbury, July 1845), and a cake crusher, on an improved principle, invented, improved, and manufactured by the exhibitors.

HENRY CLAYTON, of the Atlas Works, 21, Upper Park-place, Dorset-square, London.

A "Clayton's" patent double action tile, pipe, and brick machine, combining the "vertical and horizontal" modes of working (in addition to the numerous prizes this machine has received from the Royal Agricultural Societies of the United Kingdom, it last season had awarded the prize of the Royal North Lancashire Agricultural Society, the prize of the Yorkshire Agricultural Society, and the prize of the Staffordshire Agricultural Society), (new implement) a "Clayton's" horizontal double box, tile, pipe, and brick machine, for the horizontal plan of working only, (new implements) two of "Clayton's" horizontal (single) box tile, pipe, and brick machine, a "Clayton's" improved (Archimedian knife) pugging mill for preparing clay for tile and brick making, plans, working drawings to scale, for the erection of kilns, sheds, hakes, &c., for tile and brick works, improved patent steel brick and other moulds, for moulding (by hand) all kinds and shapes of bricks, paving and roofing tiles, fancy goods, &c., Clayton's "cycloidal" shape and other shapes of steel blade draining tools, forming a complete set of tools adapted for general draining, made with polished or black blades (the "cycloidal shape" of tools for clay land and tenacious soils was awarded a prize of £5 by the Royal Agricultural Society at Northampton), a "Clayton's" spear shape and tri faced" steel blade draining tools, Clayton's steel blade draining tools of various descriptions for general purposes, and a (new implement) Clayton's "drain consolidator and chaser," for equalizing and producing a firm bottom, and an uniform chase in the drain for pipe drain tiles, suited for any depth from two to five feet deep, invented, improved, and manufactured by the exhibitor (this new implement, for rendering drainage more perfect and secure, was last season awarded the prizes of Royal North Lancashire Agricultural Society, the Yorkshire Agricultural Society, and the North Staffordshire Agricultural Society); Clayton's polished "tempered steel" garden spades, universal "spring steel" garden forks, &c., &c., improved and manufactured by the exhibitor; and specimens of draining pipes, draining and other tiles, hollow bricks, building blocks, &c., from various tile works, made by "Clayton's patent machines."

JOHN HOWARD AND SON, of Bedford.

A patent iron plough, with two wheels, marked JA (prizes awarded to this plough by the Royal Agricultural Society of England:—The first prize of £5, at the Liverpool meeting; the first prize of £5, at the Bristol meeting; the first prize of £10, at the Shrewsbury meeting; at Newcastle upon Tyne, the first prize of £10, for the best plough for light land, and the first prize of £10, for the best plough for heavy land, were both awarded to this implement; also at Northampton, 1847; at York, 1848; and at Norwich, 1849), a patent iron swing plough, a patent iron plough with two wheels (the exhibitors have received from the Royal Agricultural Society the following premiums for this plough:—the first prize at Northampton, 1847; the first prize at York, 1848), a patent iron plough, with two wheels, marked JD (this plough received the first prize "for the best plough for light land," at the Norwich meeting, 1849), a patent iron plough, with two wheels, marked JK, and a patent iron double breast or Northumberland plough, invented and manufactured by the exhibitors; a patent subsoil plough, or sub pulverizer, invented and patented by the

late John Reed, of London, now awarded to the exhibitors (the Royal Agricultural Society has awarded the following premiums to this implement:—the first prize of £10, at the Southampton meeting, in 1844; the first prize of £10, at the Shrewsbury meeting, 1845; the first prize of £10, at the Newcastle on Tyne meeting, in 1816; the first prize of £10, at Northampton, 1847; and at York, 1846); improved wrought iron lever scarifiers, or cultivators, improved iron horse hoes, invented and manufactured by the exhibitors; several sets of patent iron jointed and drag harrows, with whippetree, invented by W. Armstrong and J. Howard, of Bedford, and manufactured by the exhibitors (the first premium of the Royal Agricultural Society was awarded to these harrows at the Derby meeting; at the meeting of the Royal Agricultural Society, held at York, the first prize was again awarded to the exhibitors); a set of improved trussed whippetrees, invented by Egerton Harding, Esq., of Oldsprings, improved and manufactured by the exhibitors; two sets of three horse equalizing whippetrees, improved and manufactured by the exhibitors; a patent horse drag rake, invented and manufactured by the exhibitors; an improved Norwegian harrow, improved and manufactured by the exhibitors; two improved iron corn mills for farm purposes, an improved horse power for driving agricultural machines, invented and manufactured by the exhibitors; two improved Bedfordshire carts, improved and manufactured by Maynard and Son, of Bedford; and sundry models and baskets of fittings, &c., &c.

WILLIAM AND JOSEPH BIBBINGS, of Zeal Monachorum, near Crediton, Devon.

A pair of iron harrows, and a horse hoe, invented by William Bibbings, sen., of Zeal Monachorum, improved by William Bibbings, jun., of Zeal Monachorum, and manufactured by the exhibitors.

DEANE, DRAY, and DEANE, of Swan Lane, Thames-street, London, Middlesex.

(New implement) a portable steam engine of four horse power, invented, improved, and manufactured by George Howe, of Southwark, London; (new implement) a portable grinding mill for breaking agricultural produce, and a mill for grinding and kibbling all kinds of grain, invented, improved, and manufactured by the exhibitors; a hand power chaff engine, and a registered self feeding chaff machine, invented and manufactured by Richmond and Chandler, of Salford; a flour mill for grinding and dressing corn, invented and manufactured by the exhibitors; a Sussex churn, invented and manufactured by Green and Hale, of Lewes; a registered churn, invented and manufactured by Thewlis and Griffiths, of Warrington; a circular pig trough, invented and manufactured by the exhibitors; a registered self feeding chaff machine, and a bean and oat mill, invented and manufactured by Richmond and Chandler, of Salford; a hand dibbler, invented and manufactured by Jesse Ross, of Leicester; a portable engine for farm or garden purposes, an enamelled manger, an enamelled corner manger, a stable pail, and an iron wheelbarrow, invented and manufactured by the exhibitors; a hand dibbler, invented by Mr. Nicholls, and manufactured by the exhibitors; a plate glass safety stable lantern, and a weighing machine, invented and manufactured by the exhibitors; a kibbling mill, and a mill for linseed, corn, &c., invented and manufactured by Richmond and Chandler, of Salford; (new implement) an improved corn rick stand, invented and manufactured by the exhibitors; a cottage stove or range, invented by M. Soyer, of St. James's, and manufactured by the exhibitors; the vertical mangle, invented and manufactured by E. O. and L. Tindall, of Scarborough; a hand cesspool and tank cleanser, a wrought iron liquid manure pump, a set of imperial corn measures, a galvanized corrugated iron shepherd's house, a long pig trough, a straight pig trough, a farmer's weighing machine, and a weighing machine for general purposes, invented and manufactured by the exhibitors; a patent butter cooler, invented and manufactured by Musters and Co., of Oxford-street, London; a wrought iron sack barrow, a liquid manure pump, and a garden stool, invented and manufactured by the exhibitors; a rustic chair; (new implement) a patent horse hoe, and an enamelled milk pan, invented and manufactured by the exhibitors.

JOHN GILLET, of Brilles, near Shipston-on-Stour, Worcester.

Two patent horse or hand power guillotine chaff engines,

invented by James Ward, of Stratford-on-Avon, and improved and manufactured by the exhibitor; a patent turnip cutter, invented and manufactured by the exhibitor; a patent rick ventilator, invented, improved, and manufactured by the exhibitor (obtained a silver medal at the Derby meeting); an universal mill, improved and manufactured by the exhibitor.

JOSIAH SIMS, of Tavistock, Devon.

A cottage cooking stove, invented and manufactured by the exhibitor.

CHARLES STADDON, of Brampford Speke, near Exeter, Devon.

A drill for small occupations, improved and manufactured by the exhibitor.

EDWARD WEIR, of 351, Oxford-street, London, Middlesex.

An improved circular saw table, and boring machine, a portable wrought iron liquid manure pump, stand, and pipe, a portable wrought iron liquid manure pump to affix to cart, (new implement) an irrigator, portable manure pump, fire, or garden engine, and (new implement) a set of valve apparatus for a liquid manure or water cart, invented and manufactured by the exhibitor; (new implement) specimens of improved flexible canvas hose, for liquid manure or water, and (new implement) a registered union joint for connecting lengths of canvas hose, invented and manufactured by Burgess and Key, of London; an improved draining level, and an improved workman's drain level, invented and manufactured by the exhibitor; several-sized metallic churns, invented by Johnson, of London, and manufactured by the exhibitor; an improved curd breaking machine, invented and manufactured by the exhibitor; an improved corn mill for producing fine meal, improved and manufactured by the exhibitor.

JOHN WHITEHEAD, of Preston, Lancashire.

Two drain pipe and tile machines (to these machines were awarded the prize of £20 at the York meeting of the Society, July, 1848, and also the prize of £20 at the Norwich meeting, July, 1849), and an improved apparatus for the application of power to drain pipe and tile machines, invented, improved, and manufactured by the exhibitor; four rolls of iron wire hareproof fencing, and four rolls of galvanized wire hareproof fencing, manufactured by the exhibitor.

WILLIAM BUSBY, of Newton-le-Willows, near Bedale, Yorkshire.

A two-wheeled plough, invented and manufactured by the exhibitor (the prize of £10 was awarded to this plough at the Royal Society's meeting held at Northampton, 1847, and £10 at Royal Society's meeting held at York, 1848); three two-wheeled ploughs, and a swing plough, invented and manufactured by the exhibitor; a horse hoe for ridge work, invented, improved, and manufactured by the exhibitor (a silver medal was awarded to this implement by the Royal Agricultural Society at York, 1848, and £5 by the Society at Norwich, 1849; five horse hoes, a light horse hoe, a very light horse hoe, a horse rake, and a set of undulating harrows, invented and manufactured by the exhibitor; one-horse carts or harvest carts, invented by W. Leister, Esq., of Dunse Bank, Yorkshire, and manufactured by the exhibitor; drills for corn, invented by the Rev. W. Wharton, rector of Barningham, and manufactured by the exhibitor (to this implement was awarded the silver medal at the Society's meeting at Norwich, 1849); a two-horse corn or turnip drill, invented by the Rev. W. Wharton, rector of Barningham, and improved and manufactured by the exhibitor.

JAMES COMINS, of South Molton, Devon.

Good ploughs for general purposes, or for deep ploughing, registered one-way turnover or turnwrest ploughs, original registered one-way turnover or turnwrest ploughs, a good light common plough for general purposes, and a subsoil pulverizer (it was awarded the prize of £5 at the Royal Agricultural Society's meeting held at Norwich in July, 1849), invented, improved, and manufactured by the exhibitor; paring ploughs, improved and manufactured by the exhibitor; a set of light harrows, a set of heavy harrows, a pair of harrows, two small horse hoes, and a horse hoe, invented, improved, and manufactured by the exhibitor; three large horse hoes, invented by the exhibitor, improved by Mr. Willis, of Swimbridge, and

manufactured by the exhibitor; (new implement) a horse hoe on the flat, (new implement) a cultivator, grubber, and scarifier, (new implements) two pair-horse scarifiers, a draining plough, and a plough for filling in drains, invented, improved, and manufactured by the exhibitor; two cottage stoves, manufactured by the exhibitor; two oven doors and frames, manufactured by Messrs. Hardy and Padmore, of Worcester; and sets of whippetrees, manufactured by the exhibitor.

JOHN CORNES, jun., of Currow Works, near Norwich, Norfolk.

(New implement) a registered thrashing box for steam or horse power, invented by R. J. Blyth, of Norwich, improved and manufactured by the exhibitor; a straw shaker and elevator, a thrashing box for steam or horse power, a thrashing box for horse power, for two or more horses, (new implements) registered dressing machines, registered chaffing machines for steam, horse, or hand power, several registered chaffing engines for hand power, registered chaffing engines for hand or other power, registered chaff or litter cutters for hand power, corn crushers for steam, horse, or hand power, a corn crusher for hand power, and improved cheshire churns, invented, improved, and manufactured by the exhibitor; two compound lever cheese presses, invented and manufactured by Robert Bruckshaw, of Longslow, Salop (this article was awarded a silver medal at the York meeting of the Royal Agricultural Society); two diminutive mangles for private use, two turnip cutters for sheep and cattle, invented, improved, and manufactured by the exhibitor; a universal cultivator and scarifier, for two or more horses, a universal wheel plough, with patent whippetrees, a universal wheel plough, with subsoil cutter attached, and whippetrees complete, a universal plough, with improved steering wheels, &c., a one way or turnwrest plough, with improved wheels, &c., complete, two expanding horse hoes, and a horse power for chaff cutting machine, invented and manufactured by the exhibitor; a land roll, invented, improved, and manufactured by the exhibitor; a set of three strong whippetrees, and a set of three whippetrees, invented by Egerton Harding, Esq., of Old Springs, Stafford.

LEWIS B. ELLIOT, of Chapel Brompton, near Northampton, Northamptonshire.

Two-wheeled ploughs with lever bar, and a double mould-board plough, invented by the exhibitor, and manufactured by William Langdell, of Kingsthorpe.

HUMPHRY BLAKE, of Woodbury, near Exeter, Devon.

A pair-horse scarifier, improved and manufactured by the exhibitor; a horse hoe on the flat, invented, improved, and manufactured by the exhibitor; (new implement) a drill for small occupations, (new implement) a turnip drill on the ridge, (new implement) a pair horse dibbler or seed depositor, invented and manufactured by the exhibitor.

HUGH CARSON, of Warminster, Wilts.

A portable four-horse power thrashing machine, improved and manufactured by the exhibitor, a seven-share scarifier, and a subsoil plough, invented, improved, and manufactured by the exhibitor (this implement obtained a prize of £10 at the meeting of the Royal Agricultural Society of England at Derby, in 1843, and was strongly recommended by the judges); a chaff-cutting engine No. 1, and a chaff-cutting engine No. 2, improved and manufactured by the exhibitor; a patent turnip cutter, invented by Edmund Moody, of Maiden Bradley, improved and manufactured by the exhibitor; a double cheese press, a single cheese press, and an oil-cake crusher, improved and manufactured by the exhibitor; wrought-iron ploughs for light lands, a wood beam and handles plough, and a wrought-iron scuffling plough, improved and manufactured by the exhibitor; a scuffer and double furrowed plough, manufactured by the exhibitor; a pair of rhomboidal harrows, improved and manufactured by the exhibitor; and (new implement) a set of harrows, invented and manufactured by the exhibitor.

RICHMOND and CHANDLER, of Victoria Bridge, Salford, near Manchester, Lancaster.

Four chaff machines, different sizes; three corn crushers, different sizes; two linseed mills; a root washer; and an improved steam apparatus, invented, improved, and manufactured by the exhibitors (obtained a prize of £5 at Derby, Southampton, and Shrewsbury); a patent sack holder, invented by

Henry Gilbert, of London, improved and manufactured by the exhibitors; a patent sack barrow, invented by Henry Gilbert, of London, improved by Joshua Cooch, of Northampton, and manufactured by the exhibitors.

BERNHARD SAMUELSON (successor to the late James Gardner) of Banbury, Oxford.

A Gardner's patent turnip cutter, for steam or horse power, invented by the late James Gardner, of Banbury, and improved and manufactured by the exhibitor; a Gardner's patent double action turnip cutter, invented by the late James Gardner of Banbury, improved by the executors of the late James Gardner, and manufactured by the exhibitor (this implement obtained a prize of £5 at the Norwich meeting, 1849); a Gardner's patent turnip cutter for sheep, invented by the late James Gardner, of Banbury, and manufactured by the exhibitor (this implement obtained a prize of £5 at the Royal Agricultural Society's meeting at Northampton, in July 1844, and a silver medal at Northampton, July 1847); a Gardner's patent turnip slicer for beasts, invented by the late James Gardner, of Banbury, and improved and manufactured by the exhibitor; a Gardner's patent turnip cutter for beasts, and a Gardner's patent chaff cutter for hand power, invented by the late James Gardner, of Banbury, and manufactured by the exhibitor; a chaff cutter for hand or horse power, and a chaff cutter for hand power, invented by William Riley, of Neithrop, and improved and manufactured by the exhibitor; a horizontal draining tile machine, invented and manufactured by the exhibitor; a patent dibbling machine, four rows (obtained various prizes at the Society's shows at Liverpool, Shrewsbury, Northampton, and York), and a patent hand or pony dibble, invented, improved, and manufactured by J. W. Newberry, of Hook Norton; a set of three zigzag harrows, 10 feet wide, invented by Wm. Armstrong, of Hawnes, and improved and manufactured by Barret, Ashton, and Shaw, of Hull; (new implements) churns of several sizes, invented by Charles Anthony, of Pittsburg, United States, and manufactured by the exhibitor; machines for crushing oilcake, improved and manufactured by Robert Maynard, of Whittleford, Cambs; a machine for crushing oilcake by hand power, improved by James Gardner, of Banbury, and manufactured by the exhibitor.

THOMAS SCRAGG, of Calveley, near Tarporley, Chester.

Two single action tile and pipe machines, and (new implement) a machine for screening clay for tile and pipe making, or manufacturing tiles and pipes, invented and manufactured by the exhibitor.

JAMES SLIGHT, of Leith Walk, Edinburgh.

(New implement) a hand cultivator, in the form as employed for hoeing drilled crops, invented and improved by C. K. Sivwright, Esq., of Cargillfield, Edinburgh, and manufactured by the exhibitor.

WILLIAM WILLIAMS, of Bedford, and **LAURENCE TAYLOR**, of Cotton End, Bedford.

Three sets of patent four beam diagonal iron harrows for seeds (these harrows obtained a prize of £5 at the Derby meeting, 1843; at the Southampton meeting, 1844; at Shrewsbury, 1845; at Northampton, 1847; and at Norwich, 1849); a pair of patent drag harrows, a patent horse rake (a prize of £5 was awarded to this implement at the Southampton meeting, 1844, and also at the Norwich meeting, 1849), and a registered chaff engine with four knives, invented by Samuel Taylor, of Cotton End, and manufactured by William Williams, of Bedford; a chaff engine with three knives and 9-inch mouthpiece, invented and manufactured by William Williams, of Bedford; a chaff engine with two knives and 8-inch mouthpiece, invented, improved, and manufactured by William Williams, of Bedford; a machine for making draining pipes and tiles, invented by Saunders and Williams, of Bedford, and improved and manufactured by William Williams, of Bedford (a prize of £25 was awarded to this machine at the Northampton meeting); a machine for making draining pipes and tiles, invented and manufactured by William Williams, of Bedford; a patent wrought iron plough with two wheels, for general purposes; and a patent wrought iron plough with two wheels, invented by Samuel Taylor, of Cotton End, and manufactured by William Williams, of Bedford (a prize of £5 was awarded to this implement at the Norwich meeting,

1849; a basket of dies, shares, &c., for tile machines and ploughs.

JAMES WOODS, of Stowmarket, Suffolk.

(New implement) an universal corn crushing and grinding mill, invented, improved, and manufactured by the exhibitor; a mill for crushing linseed, malt, and oats, improved and manufactured by the exhibitor; and a mill adapted to small occupiers and gentlemen's stables, invented and manufactured by the exhibitor.

WILLIAM C. CAMBRIDGE, of Lavington Iron Works, Cathay, near Bristol, Somersetshire.

A portable steam engine of four horse power, with tubular boiler (five prizes have been awarded to W. C. C. by the Royal Agricultural Society of England, the last being £50), a portable bolting thrashing machine, a patent portable thrashing machine of two horse power, a set of models, two pair of portable mill stones, and a patent press roller and clod crusher, invented and manufactured by the exhibitor; a Norwegian harrow, and a patent press wheel roller and clod crusher, invented and manufactured by the exhibitor; and a winnowing machine.

JOHN COOCH, of Harleston, near Northampton.

Improved patent corn-dressing machine (this machine, in its original shape, obtained the prize of £10 at the Liverpool meeting, July 1841; also a prize of £15 for improvements at the Northampton meeting 1847), a barley hummeller, invented, improved, and manufactured by the exhibitor; and four patent sack holders and barrows, the sack holders invented by Henry Gilberts, late of St. Leonard's-on-the-Sea, improved and manufactured by the exhibitor, the patent sackbarrow invented and manufactured by the exhibitor.

WILLIAM CURSEN, **WILLIAM CURSEN, JUN.**, and **JOHN CURSEN**, of South Zeal, in the parish of South Tawton, near Okehampton, Devon.

(New implement) a ridging plough and turnip drill, (new implement) a turnip drill, (new implement) a barrow hand drill, (new implement) a barrow hand turnip drill, and (new implement) a turnip slicer, invented and manufactured by the exhibitors.

JAMES HAYES, of Elton, near Stilton, Huntingdon.

(New implements) Two grinding mills, invented and manufactured by the exhibitor.

JOHN HOLMES and SONS, of Prospect-place, Globe-lane, Norwich, Norfolk.

An improved thrashing machine, an improved thrashing machine for steam or horse power (this machine was awarded the prize of £4 at the East Norfolk meeting, held at Norwich, 1844), and a portable horse-works for thrashing, invented improved, and manufactured by the exhibitors; (new implement) a general-purpose drill for small occupations, invented and manufactured by the exhibitors; a twelve-row lever corn-drilling machine, improved and manufactured by the exhibitors; a four row lever drill for turnips and mangold-wurtzel with manure on the flat, invented, improved, and manufactured by the exhibitors; a three-row lever drill for turnips or mangold-wurtzel with manure on the ridge or flat, invented, improved, and manufactured by the exhibitors; (new implement) a one-row lever drill for turnips or mangold wurtzel with manure on the ridge or flat, invented, improved, and manufactured by the exhibitors; (new implement) a two-row lever drill for turnips and mangold wurtzel on the ridge, invented and manufactured by the exhibitors; (new implement) a hand barrow drill, to work with cups, for turnips or mangold-wurtzel and carrots, on the flat or ridge, invented, improved, and manufactured by the exhibitors (this drill was awarded the prize of £3 at the Royal Agricultural Society's meeting held in Norwich in 1849); (new implement) a hand barrow grass-seed sowing machine, to work with cups, invented and manufactured by the exhibitors; a one-row lever hand drill, for turnips, mangold wurtzel, or carrots, on the ridge or flat, invented, improved, and manufactured by the exhibitors; (new implement) a registered broadcast manure distributor, for guano, nitrate of soda, salt, soot, and any other manure for top dressing, invented and manufactured by the exhibitors; an improved registered horse lever rake, a corn dressing machine, and (new implement) a barley aveller, or huamelling machine, invented, improved, and manu-

factured by the exhibitors; a chaff-cutting machine, marked No. 6, improved and manufactured by the exhibitors; a rape and liseed-cake crusher, invented, improved, and manufactured by the exhibitors; a turnip and mangold-wurtzel cutter, for beasts or sheep, improved and manufactured, by the exhibitors; and a hand machine for turnips, invented, improved, and manufactured by the exhibitors.

JOHN MILWARD, of Newton Abbot, Devon.

A drill machine for general purposes, improved and manufactured by the exhibitor; a horse hoe, invented by B. Weber, improved and manufactured by the exhibitor; a potato digger or pulverizing plough, improved and manufactured by the exhibitor; a one way or turnwrest plough, invented by the Webbers, of Newton, improved and manufactured by the exhibitor; and a one-horse cart, manufactured by the exhibitor.

WILLIAM PIERCE, No. 5, Jermyn-street, London.

A cottager's grate, with trivet and hobs, improved and manufactured by the exhibitor; (new implement) a cottager's stove or universal fire lump grate; and (new implement) a cottager's grate for warming two rooms; invented and manufactured by the exhibitor.

WILLIAM TWOSE, of Halberton, near Tiverton, Devon.

(New implement) A corn-dressing machine, improved and manufactured by the exhibitor.

HENRY CURTIS, Moorend and Hambrook, near Bristol, Gloucestershire.

(New implement) a portable one-horse power drain-pipe and tile machine, invented and improved by Alfred Tuckett, of Warmley, near Bristol, and manufactured by James Sweetman, of Bristol; (new implement) a set of improved draining tools, including "Curtis's registered draining spades," invented by the exhibitor, and manufactured by Th. Hobbs, of Frenchay, near Bristol.

BARRETT, EXALL, and ANDREWES, of Katesgrove Iron Works, near Reading, Berks.

A one wheel plough, invented and manufactured by the exhibitors (this plough obtained the prize of £5 at the Royal Agricultural Society's Meeting at Liverpool); a patent subsoil plough, invented by the late Mr. John Read, of London, and manufactured by the exhibitors (to this plough was awarded the prize of £10 at the Royal Agricultural Society's Meeting at Southampton, of £10 at Shrewsbury, of £10 at Newcastle-on-Tyne, and of £10 at Northampton); a 3 iron two wheeled plough, a 2 iron lever paring plough, and a 1 two-wheel plough, improved and manufactured by the exhibitors; (new implement) a three tined scarifier, and (new implement) a paring-plough, invented by the Rev. Thos. Digges La Touche, of Kimaule, Ireland, improved and manufactured by the exhibitors; a set of patent iron harrows, invented by W. Armstrong, of Hawnes, and manufactured by the exhibitors (these harrows obtained a prize of £5 at the Meeting of the Royal Agricultural Society at Derby, and of £5 at York); a fourteen-inch double cylinder field roller, a twenty inch double cylinder field roller, and a registered hay making machine, invented and manufactured by the exhibitors; a patent turnip cutting machine, invented by the late James Gardner, of Banbury, improved by Mr. Samuelson, of Banbury, and manufactured by the exhibitors; a portable forge, an oilcake crusher, two hand power universal mills, and (new implement) a hand power universal mill, a one horse power universal mill, and a two horse power universal mill, invented and manufactured by the exhibitors; four different sized chaff cutting machines, invented by Mr. John Cornes, of Barbridge, improved and manufactured by the exhibitors (this machine gained a prize of £10 at the Royal Agricultural Society's Meeting at Shrewsbury in 1845, at Newcastle-on-Tyne in 1846, at Northampton in 1847, at York in 1848, and at Norwich in 1849); two registered cam chaff cutters, invented and manufactured by the exhibitors; a furze or gorse cutting and bruising machine, invented, improved, and manufactured by the exhibitors (this machine obtained a prize of £5 at the Royal Agricultural Society's Meeting at York in 1848, and Norwich in 1849); a barley aveller or hummeller, improved and manufactured by the exhibitors; two hand power thrashing machines, invented and manufactured by the exhibitors; (new implement) a one horse or hand power patent thrashing machine, with one horse power patent gear work attached, in-

vented, improved, and manufactured by the exhibitors; a two horse power patent thrashing machine and patent gear-work, a one horse power patent safety gearwork, a two horse power patent safety horse gear, a three horse power patent safety horse gear, a four horse power patent safety horse gear, a three horse power thrashing machine, a four horse power steam thrashing machine, a four-horse power portable steam engine, and a seven horse power portable steam engine, invented and manufactured by the exhibitors.

THOMAS and HENRY BRINSMEAD, of Saint Giles, near Great Torrington, Devon.

A corn dressing machine, improved and manufactured by the exhibitors; and (new implement) a barley peeler or hummeller, invented and manufactured by the exhibitors.

JAMES BARNETT CARRALL, of Combe-street, near Exeter, Devon.

A new and improved turnwrest or single plough, invented, improved, and manufactured by the exhibitor.

GEORGE COTTAM and SAMUEL HALLEN, of 2, Winsley-street, Oxford-street, London.

A serrated chain harrow, invented by James Smith, of Deans-ton, improved by George Cottam, and manufactured by the exhibitors (this machine obtained a silver medal at the Society's Meeting at Derby; a seed and manure drill, a saw table and boring machine, invented by George Cottam, and manufactured by the exhibitors; (new implement) a patent perpendicular saw table, and (new implement) a patent straw and chaff cutter, for long and short lengths, invented by George and Edward Cottam, and manufactured by the exhibitors; a bruising machine for grain, invented by George Cottam, and manufactured by the exhibitors; several sizes of metallic churn, invented by Mr. Johnson, of London, and manufactured by the exhibitors; (new implement) a liquid manure pump, invented by George Cottam, and manufactured by the exhibitors; (new implement) a smut machine invented by Mr. Hall, of Ewell, Surrey, improved by George Cottam, and manufactured by the exhibitors; (new implement) a patent grinding mill, invented by George and Edward Cottam, and manufactured by the exhibitors; (new implement) a wrought iron portable manure pump, (new implement) a guano spreader, invented by George Cottam, and manufactured by the exhibitors; a winnowing machine, invented by Samuel Wheatley, of Radcliff, and manufactured by the exhibitors (this machine was awarded a prize of £10 at the Society's Meeting at Shrewsbury, July, 1845); an odometer or land measure, and a dynamometer or draught gauge, invented by George Cottam, and manufactured by the exhibitors; a stable stall, manufactured by the exhibitors; a patent fumigator, invented by Mr. Brown, of London; and an American churn, invented by Mr. Anthony, of M—, and manufactured by Mr. K. G. Key, of London.

WILLIAM CROWLEY, of Newport Pagnell, Buckinghamshire.

(New implement) a light one horse cart for general purposes (the Newport cart); (new implement) a set of Newport hames, and (new implement) a universal hoe or skimmer, invented, improved, and manufactured by the exhibitor.

JOHN TANNER DAVY, of Rose Ash, near South Molton, Devon.

(New implement) a horse hoe, for hoeing between the drills of mangold wurtzel, turnips, beans, &c., and wheat, invented and improved by the exhibitor, and manufactured by Mr. James Comins, of South Molton, Devon.

JOHN DICKER, of Chagford, near Exeter, Devon.

A winnowing machine and a flour machine, improved by the exhibitor.

JOHN TUCKER, of Orchard Bishop, near Crediton, Devon.

A four-horse power portable thrashing machine and a winnowing machine, improved and manufactured by the exhibitor.

GEORGE DILLING, of Chawleigh, near Chulmleigh, Devon.

A wrought-iron plough for general purposes, and a wrought-iron cultivator, grubber, and scarifier (with two sets of nine

A patent improved double-action haymaker, on S. and Co.'s patent wrought-iron wheels, invented, improved, and manufactured by the exhibitors (this implement obtained a prize of £5 at the Royal Society's Meeting, held at Newcastle, July 1846; £5 5s. at the great Yorkshire Meeting; and £5 5s. at the Derbyshire Meeting, 1846, and again at the great Yorkshire Meeting, 1847; also the Royal Society's gold medal, 1848, London; York; and again at the great Yorkshire Meeting, 1849, £3 3s., and the Royal Society's prize of £5 for the best haymaker, exhibited at Norwich, July 1849); an improved patent horse-drawn (all iron), folding, combined harrow and roller, for agricultural purposes; a patent levered sickle-barre harrow, both improvements having obtained the Royal Society's gold medals, 1848, London; York; and the Royal Society's prize of £10 at Norwich, in July, also the prize of £5 5s. at the great Yorkshire Meeting, in August 1849); a patent safety cast-iron, lifting and lowering screw-down carrier, patent chain pulley, and a patent screw-down carrier, all three inventions being registered.

and axle, invented, improved, and manufactured by the exhibitors.

JAMES SMYTH, of Peasenhall, Yoxford, Suffolk, and Witham, Essex.

A pair-horse steerage corn and turnip drill, a patent eleven-rowed corn drill, a patent twelve-rowed corn drill, a patent fourteen-rowed corn drill, and for clover-seed sowing, a patent fifteen-coulter corn drill, a patent manure drill, a patent corn drill for eight or ten furrow work, a corn and seed drill for small occupations, a turnip-seed and manure drill, a patent drop drill, and a patented manure distributor, invented, improved, and manufactured by the exhibitor; and a two-rowed turnip-seed or mangold-wurtzel Northumberland rowl drill, improved and manufactured by the exhibitor.

WILLIAM PROCKTER STANLEY, of Peterborough, Northamptonshire.

A rape and linseed cake breaker, and three different sized registered steam-cooking apparatus, invented, improved, and manufactured by the exhibitor (this article was awarded £10 at the Society's Show at York, 1848, also £5 at the Society's Show at Norwich, 1849); a Stanley's registered roller mill, improved and manufactured by the exhibitor (this article was awarded the silver medal at York, 1848); a patent sack barrow, sack holder, and sack raiser, combined in one machine, improved and manufactured by the exhibitor; a summer house or shepherd's house, and a labour machine for hand power, invented, improved, and manufactured by the exhibitor; and an improved steerage horse hoe.

JAMES WHITE, of 266, High Holborn, London.

(New implement) a patent gorse bruiser, and (new implement) a patent cider mill, invented and manufactured by the exhibitor; a steel mill to grind agricultural produce into fine meal, steel corn mills, and universal steel mills for stock feeding, improved and manufactured by the exhibitor; a steel mill for linseed, two flour dressing machines, and a bean splitter, manufactured by the exhibitor; and a corn crusher, improved and manufactured by the exhibitor.

WIGHTMAN and DENING, of Chard, Somersetshire.

A double wheel strong plough, spine coulter, and steel turn-furrow; a single wheel plough, spine coulter, and steel turn-furrow; and a light combing or drill plough for general purposes, improved and manufactured by the exhibitors; (new implement), a tubular field gate, with wrought iron posts, invented and manufactured by the exhibitors; a pair of corrugated iron doors, improved and manufactured by the exhibitors; and (new implement) a wrought iron triple table cylindrical boiler, for hot water apparatus, fitted with doors and bars, invented and manufactured by the exhibitors.

WILLIAM WILLMILD, of Wellington, Somersetshire.

(New implement), a four horse power portable thrashing machine, invented and manufactured by the exhibitor.

WILLIAM BALL, of Rothwell, near Kettering, Northampton.

An iron plough (marked the "Criterion Plough"), invented by the exhibitor; this plough gained the prize for general purposes at the Norwich meeting, 1849; four iron ploughs, invented and manufactured by the exhibitor; a light waggon, and a one horse cart for general purposes, invented and manufactured by the exhibitor; and a set of swaytrees; manufactured by the exhibitor.

CHARLES BARNARD and JOHN BISHOP, of Norwich, Norfolk.

Several rolls of light jappanned wire hare and rabbit proof netting, 2-inch mesh, 2 feet wide, and stronger descriptions for sheep, &c., invented and manufactured by the exhibitors; rolls of jappanned sparrow-proof wire netting, a strong wire net plant or tree guard, a wrought-iron ornamental plant guard, and a roll of ornamental wire garden bordering, invented and manufactured by the exhibitors; a length of strained wire fence for horses or heavy cattle, invented, improved, and manufactured by the exhibitors; an improved wrought-iron standard for strained wire fencing, a five-bar iron hurdle, an iron hurdle, an iron hurdle for cattle and sheep, made hare and rabbit-proof, with upright rods; hare and rabbit-proof hurdles, and an ornamental wire game hurdle, invented and manufac-

tured by the exhibitors; a twelve-foot wrought-iron sheep fold hurdle, on wheels, improved and manufactured by the exhibitors; a wrought-iron field gate, and a strong wrought-iron field gate, invented and manufactured by the exhibitors; (new implement), a wrought-iron centre-hinge field gate and posts, improved and manufactured by the exhibitors; ornamental wrought-iron garden gates with cast-iron posts, invented and manufactured by the exhibitors; a wrought-iron garden gate, improved and manufactured by the exhibitors; an ornamental wrought-iron carriage gate, invented, improved, and manufactured by the exhibitors; a wrought-iron carriage gate, a strong wrought-iron garden chair, and a strong wrought-iron garden seat, invented and manufactured by the exhibitors; a wrought-iron folding garden stool, with galvanized wire net seat, and a wrought-iron bedstead, suitable for servants' apartments, improved and manufactured by the exhibitors; a portable iron bedstead, invented and manufactured by the exhibitors; a patent self-rolling mangle, invented by Charles Barnard, of Norwich, and manufactured by the exhibitors; a water ram, invented by J. M. Montgolfier, improved and manufactured by the exhibitors; a cast-iron window frame and casement, invented and manufactured by the exhibitors; a strong wrought-iron hay rack, a barrow wheel, a nine wrought-iron garden stakes, and five strong wrought-iron garden stakes, with cast-iron points, improved and manufactured by the exhibitors.

J. L. BENHAM and SONS, of 19, Wigmore-street, London; and **D. and E. BAILEY**, 272, High Holborn, London.

(New implement), the cottager's stove, to cook with one pound of coal or coke per hour, invented by John Grant, Esq., and manufactured by the exhibitors; a metallic butter churn, in five sizes, manufactured by the exhibitors; a freeing machine, invented and manufactured by J. L. Benham and Sons, of 19, Wigmore-street, London.

EDWARD HAMMOND BENTALL, of Heybridge, near Maldon, Essex.

A Bentall's patent broadshare and subsoil plough combined, and a Bentall's patent subsoil plough, invented and manufactured by the exhibitor.

JOHN CORNES, of Barbridge, near Nantwich, Chester.

Several chaff-cutting machines, with three and two knives, registered, invented, improved, and manufactured by the exhibitor. One of these machines gained a prize of £10 at the Royal Agricultural Society's meeting at Shrewsbury in 1845, at Newcastle-upon-Tyne in 1846, at Northampton in 1847, at York the Society's silver medal in 1848, and at Norwich the prize of £10 in 1849.

DUFAUR and Co., of No. 21, Red Lion-square, London.

A patent hand seed dibble, with seven depositors (this implement gained the prize of £3 offered by the Royal Agricultural Society at Norwich in 1849); a patent hand seed dibble, with shifting boxes; (new implement) a patent hand seed dibble on wheels, (new implement) a patent horse seed dibble, forming also a drop drill; (new implement) a horse cultivator, forming also a paring plough and horse hoe either on the ridge or the flat; (new implement) a subsoil plough and pulverizer, forming also a horse cultivator, a paring plough, and horse hoe on the flat or ridge; (new implement) a patent hand implement for broadcasting artificial manure; (new implement) a patent horse manure distributor, and implement for seeding; (new implement) a patent hand drop drill, (new implement) a patent horse drop drill, (new implement) a hand cultivator and drill hoe, registered according to Act of Parliament; and (new implement) an iron single horse plough, forming also, with double mould board, a strike plough, &c.; all invented by Dr. Newington, of 36, Wellington-square, Hastings, and manufactured by the exhibitors.

JOHN EATON, of Woodford, near Thrapstone, Northampton.

Three specimens, different sizes, of a one-horse cart, for general farm purposes (to this cart was awarded the prize of £5 by the Royal Agricultural Society at their meeting held at York in July, 1848), and (new implement) a patent circular sheep crib, invented, improved, and manufactured by the exhibitor.

JOHN FOWLER, jun., of Melksham, Wilts.

(New implement) a wooden pipe-making machine, and (new implement) two lathes on one bed, invented by the exhibitor and manufactured by William Eyres, of Melksham; (new implement) a draining plough, invented by the exhibitor and manufactured by Stratton and Co., of Bristol; (new implement) a windlass, for drawing the above, invented by the exhibitor and manufactured by William Eyres, of Melksham; and a model of farm buildings, invented and manufactured by the exhibitor.

RICHARD GARRETT and SON, of Leiston Works, near Saxmundham, Suffolk.

A stand of models of agricultural machinery, manufactured by the exhibitors; a drill for general purposes (prizes were awarded to this drill at Liverpool, 1841, £10; at Derby, 1843, £30; at Southampton, 1844, £20 and a medal; and at Northampton, 1847, £15); a drill for turnips and manure on the flat (prizes were awarded for this drill at Cambridge, 1840, £10; at Northampton, 1847, £10; at York, 1848, £10); a drill for turnips and mangold wurtzel, with manure, on the ridge (prizes were awarded for this drill at Bristol, 1842, £20; at Northampton, 1847, £10; at Norwich, 1849, £10); a patent drop drill for flat and ridge work (a prize of £10 was awarded to this drill at Norwich, 1849), and a patent broadcast manure distributor, 7 feet wide—all the above were invented and manufactured by the exhibitors; a fourteen-row lever corn drill (a prize of £10 was awarded for the best corn drill at Norwich, 1849); a nine-row lever corn and seed drill, a nine-row steorage lever corn and seed drill, improved and manufactured by the exhibitors (a prize of £10 was awarded for the best corn and seed drill at Norwich, 1849); and a seven-row lever corn drill, improved and manufactured by the exhibitors; a barrow hand drill, and a hand barrow seed drill, invented and manufactured by the exhibitors; a hand seed drill, with levers, improved and manufactured by the exhibitors; a Garrett's patent horse hoe for flat and ridge work (prizes were awarded for this hoe at Liverpool, 1841; at Bristol, 1842; at Derby, 1843; at Southampton, 1844; at Northampton, 1847; at York, 1848; and at Norwich, 1849); a patent horse hoe, and a patent horse hoe for ridge work, invented and manufactured by the exhibitors; a four-horse power thrashing machine; invented, improved, and manufactured by the exhibitors (prizes were awarded for this machine at Newcastle, in 1846, £25; Northampton, 1847, £20; York, 1848, £20; and Norwich, 1849, £25); a four horse power bolting thrashing machine barn work, a four horse power open drum thrashing machine barn work, a two horse power thrashing machine, and a patent bolting thrashing machine, with screen and straw shaker, for steam power, invented and manufactured by the exhibitors; a portable steam engine, fitted with governors and jacket complete (the first prize was awarded for this engine at the Norwich meeting in 1849); a horse power chaff-cutter, a chaff-cutter for hand power, a linseed malt and oat mill, and a rape and linseed cake crusher, improved and manufactured by the exhibitors; a corn-dressing machine, and a mill for grinding beans, peas, malt, or barley, invented and manufactured by the exhibitors; a turnip cutter, invented by the late James Gardner, of Banbury, and manufactured by the exhibitors (a prize of £5 was awarded for this machine at Southampton, a medal at Northampton, and £5 at Norwich, 1849); a patent subsoil pulverizer, invented by the late John Read, of Loudon, and manufactured by the exhibitors (prizes were awarded for this plough by the Royal Agricultural Society at Southampton £10, Shrewsbury £10, Newcastle £10, and Northampton £10); a patent lever drag rake, improved and manufactured by the exhibitors; a patent drain-pipe and tile machine, invented by Richard Weller, of Capel, near Dorking, and manufactured by the exhibitors (a prize of £5 was awarded for this machine at Newcastle, in 1846); a patent wrought-iron corn rick stand, invented by the late J. Springall, of Ipswich, and manufactured by the exhibitors (a medal was awarded to the exhibitors for this implement at Southampton); (new implement) a portable stone mill, and a winnowing machine, improved and manufactured by the exhibitors.

GARTON and JARVIS, of Exeter, Devon.

A cottage stove, on legs (portable), invented and manufactured by the exhibitors; a portable steaming apparatus, in iron case, invented, improved, and manufactured by the ex-

hibitors; a hydraulic cider press, invented and manufactured by the exhibitors.

THOMAS GLOVER, Thrussington, near Leicester.

A turf and stubble paring plough, invented, improved, and manufactured by the exhibitor (this implement has gained a prize of £4 at the society's show at Liverpool in 1843, a prize of £5 at the Derbyshire agricultural show at Chatsworth in 1843, a prize of £5 at the society's show at Northampton in 1847, a prize of £2 and a silver medal at the Yorkshire show at Scarborough in 1847, a prize of £5 at the society's show at York in 1848, and a prize of £5 at the society's show at Norwich in 1849).

JOHN GOUCHER, of Woodsetts (in the county of York), near Worksop, Nottingham.

A new patent corn extractor, four-horse power, invented, improved, and manufactured by the exhibitor.

R. GRAY and SONS, of Uddington, near Glasgow, Lanark.

An improved turnwrest or one-way plough, invented by Mr. Wilkie, of Uddington, improved and manufactured by the exhibitors (the Royal Society's prize was awarded to this plough at the Liverpool meeting, and the Highland society's prize at Glasgow); a Gray's deep-soil plough, a common Scotch swing plough for general purposes (the exhibitors were awarded the Highland society's first prizes for this implement, also by the Royal Agricultural Society of Ireland), a Gray's parallel lever subsoil pulverizer (this implement obtained the Highland and Agricultural Society of Scotland's medal at Edinburgh in 1848, first prize of Royal Agricultural Society of Ireland at Limerick in 1846, and at Kilkenny in 1848, first prize of Yorkshire Agricultural Society at Wakefield in 1846, first prize of Lincolnshire Agricultural Society at Market Rasen in 1846, first prize of Royal North Lancashire Agricultural Society at Preston in 1848, and commended by the Royal Agricultural Society of England at Newcastle-upon-Tyne), and (new implement) a Gray's parallel five-tined drill grubber, invented, improved, and manufactured by the exhibitors (awarded the prize of the Highland Society and the Royal Agricultural Society of Ireland; a parallel expanding horse-hoe, for green crops, invented by Mr. Wilkie, of Uddington, improved and manufactured by the exhibitors (this implement received the Highland Society's first prize last meeting, also the first prize of the Royal Agricultural Society of Ireland), a parallel horse-hoe for green cropping, a light drill scuffle or horse-hoe, an improved cultivator grubber and scarifier for three or four horses, and a compensating lever yoke for working three horses abreast, invented, improved, and manufactured by the exhibitors; (new implement) a set of improved two-horse flexible-trussed tubular draught swings, invented and manufactured by the exhibitors; an improved one-horse Scotch farm (coup) cart, manufactured by the exhibitors; (new implement) an Anthony's patent double-acting American churn, invented by Mr. Anthony, of Pittsburg, United States, and manufactured by the exhibitors; and a model of an improved horse-work, for propelling thrashing and other machinery, invented and manufactured by the exhibitors.

WILLIAM HENSMAN and SON, of Castle Works, Woburn, Bedfordshire.

A patent iron plough, with two wheels; a patent eight-row pair-horse steorage corn and turnip drill (a silver medal was awarded to this drill at the York meeting, 1848), a patent six-row steorage corn and turnip drill, a patent iron plough with two wheels, invented, improved, and manufactured by the exhibitors; a patent steorage four-row cup drill for small occupations, invented by W. Hensman, sen., of Woburn, and improved and manufactured by the exhibitors; a patent Vandyke hand thrashing machine, improved and manufactured by the exhibitors; a patent four-horse power bolting thrashing machine, invented, improved, and manufactured by the exhibitors; (new implement) a small hand turnip drill, invented and improved by G. W. Baker, of Woburn, Beds, and manufactured by the exhibitors; a double blast winnowing machine, for all kinds of corn, invented, improved, and manufactured by A. Pridmore and Sons, of Thorpe Satchville, Leicestershire.

JOHN HERD, of Sandford, near Crediton, Devon.

Two cider mills, improved and manufactured by the exhibitor.

ALEXANDER HIGGINS, of Butleigh, near Glastonbury, Somerset.

A stall feeder's green food and liquid manure cart combined, invented and manufactured by the exhibitor.

EDWARD HILL and Co., of Brierley Hill Iron Works, near Dudley, Stafford, and London-road, Derby.

A wrought iron skin (this implement obtained the first prize of its class at the Derby meeting), a wrought iron skin with coulters attached, (new implement) a wrought iron pair-horse scarifier, (new implement) a set of wrought iron harrows, (new implement) a wrought iron horse hoe, a granary crane and winch (this implement obtained a premium at the Shrewsbury meeting), (new implement) a wrought iron store room crane, a wrought iron rick stand or saddle on cast iron pillars, a wrought iron ornamental garden seat, a wrought iron ornamental chair, a wrought iron heating barrow, a wrought iron stable or garden barrow, a roll of wire netting, a row of galvanized wire netting, specimens of black and red varnish, a wrought iron farmer's field gate fitted to wrought iron posts (this gate obtained a silver medal at the society's meeting at Derby), a wrought iron farmer's field gate hung to wood posts, a wrought iron gate post, a wrought iron field gate, a wrought iron entrance gate and cast iron capped posts, a length of continuous ox fencing with wicket hung in same (these continuous fences obtained the silver medal of the society at the Southampton and Shrewsbury meetings), a length of continuous ox fencing, a length of continuous cattle fencing, two lengths of wrought iron continuous deer fencing, a length of continuous wrought iron sheep fencing, a length of continuous wrought iron cattle fence, a length of continuous wrought iron ox fence with wicket gate hung in same, (new implement) a wrought iron sheep feeding hurdle, several wrought iron farmer's sheep hurdles, several wrought iron farmer's hurdles, wrought iron ox hurdles, game proof garden hurdles, and a wrought iron ornamental garden seat—all invented and manufactured by the exhibitors.

WILLIAM HOGG, Upton Pyne, near Exeter, Devon.

A corn-dressing machine, and a cultivator, improved and manufactured by the exhibitor.

WILLIAM R. LOMAX, of Birmingham, Warwickshire.

(New implement) a Lomax's patent chaff, &c., cutting machine, invented and manufactured by the exhibitor; (new implement) a Dean's patent hand corn mill, for grinding and dressing at one operation; and (new implement) a Dean's improved linseed crusher, invented and manufactured by Alexander Dean, of Birmingham (this machine took the Royal Agricultural Society's prize of £10 at the Shrewsbury meeting in 1845).

HENRY LOWCOCK, of Raddon Court Farm, Thorverton, near Collumpton, Devon.

A patent one-way plough, with Ransome's patent trussed iron beam (heavy land), invented and improved by the exhibitor, and manufactured by Ransomes and May, Ipswich (this implement obtained the society's prize of £5 at Southampton, and again at Shrewsbury); a patent one-way plough (light or hilly land), invented and improved by the exhibitor, and manufactured by Robert Adams, of Compton Marldon, Devon; (new implement) a pair-horse scarifier, invented by Robert Adams, of Marldon, improved by the exhibitor, and manufactured by Robert Adams, of Marldon; a horse-hoe, invented and improved by the exhibitor, and manufactured by Robert Adams and Thomas Milford, of Marldon and Thorverton; a ground plan and working drawings and elevations of a model farm house and outbuildings for a farm of 600 acres, invented and improved by the exhibitor, and designed by himself and Mr. Hayward, architect, of Exeter.

LYNCH and INGLIS, of Garratt-road, near Manchester, Lancashire.

(New implement) a portable high-pressure steam engine, with tubular boiler on wheels, invented and manufactured by the exhibitors.

MAPPLEBECK and LOWE, of Birmingham, Warwickshire.

Several Fairbank's patent weighing machines, and a steel-yard, with frame for weighing sacks, &c., manufactured by W.

and T. Avery, of Birmingham; a set of new pattern iron weights, a portable kibbling mill on frame, a portable bean splitting mill on frame, a malt mill with wheel and iron hopper, a kibbling mill with wheel and iron hopper, a bean splitting mill with wheel and iron hopper, and an improved cheese press, manufactured by the exhibitors; a set of stall posts and rails, with trapped drain and improved rack and manger, improved and manufactured by the exhibitors; a circular iron pig, dog, or sheep trough, and a circular iron pig trough, manufactured by the exhibitors; a corn and turnip drill, and a hand seed drill, invented and manufactured by William West, of Leicester; several iron hurdles, and a bundle of best fencing wire, manufactured by the exhibitors; (new implement) a pair of patent hand dibbles for wheat and other seeds, and a spud dibble for salt, manufactured by Jesse Ross, of Leicester; an improved portable forge, manufactured by the exhibitors; a cottage range, invented and manufactured by E. Biown, of Lyme; cottage grates, and an iron bedstead, manufactured by the exhibitors; a Budding's patent mowing machine, for cutting lawns, grass plots, &c., invented by E. Budding, of Dursley, and manufactured by John Ferrabee and Sons, of Stroud; a set of W. A. Lyndon's patent draining tools, invented by Josiah Parkes, Esq., draining engineer, of London, and manufactured by W. A. Lyndon, of Birmingham (the prize of £5 was awarded to the exhibitors for these tools at the Royal Agricultural Society's meeting at Northampton in 1847, as the best tools for friable land); four sets of W. A. Lyndon's patent draining tools, invented and manufactured by W. A. Lyndon, of Birmingham (the prize of £5 was awarded to the exhibitors for these tools at the Royal Agricultural Society's meeting at Northampton in 1847 as the best tools for general draining); a set of draining tools for clay land (the prize of £3 was awarded to the exhibitors of these tools at the Royal Agricultural Society's meeting at Norwich, 1849), a set of draining tools for general purposes, a trenching fork, a cast steel four prong manure fork, a cast steel three prong manure fork, a cast steel five prong barn and cowherd's fork, a cast steel four prong potato fork, and a cast steel three prong potato fork, manufactured by the exhibitors; (new implement) a patent vice, invented and manufactured by D. Harcourt, of Birmingham; and a stand of models.

GEORGE MILFORD, of Thorverton, near Collumpton, Devon.

A one horse cart for general purposes, a light waggon for general purposes, and a heavy harrow, improved and manufactured by the exhibitor.

THOMAS MOORE, of Newton St. Cyres, near Exeter, Devon.

A cider mill, and a double cheese press, invented and manufactured by the exhibitor; a drill for wheat, barley, oats, peas, or beans, improved and manufactured by the exhibitor; a horse hoe and gutter plough, and level, invented by John Bickford, of Crediton, improved and manufactured by the exhibitor; a Devonshire clipper, for spading, improved and manufactured by the exhibitor; and a clod crusher, manufactured by the exhibitor.

WILLIAM NEWZAM NICHOLSON, of Newark-upon-Trent, Nottinghamshire.

Two machines for breaking oilcake for beasts and sheep (this implement had a prize of £5 awarded to it at the Norwich show), and two machines for breaking oilcake for beasts and sheep and rapecakes for tillage, invented, improved, and manufactured by the exhibitor; a machine for grinding beans, oats, malt, barley, &c., and a set of patent tube whippetrees, improved and manufactured by the exhibitor; several cottage ranges, with registered and patented improvements, invented, improved, and manufactured by the exhibitor (this article had a prize of £5 awarded to it at the York show); a range calculated for a small farm kitchen or bailiff's cottage, with registered and patented improvements, and a superior range, adapted for a farm kitchen, with registered and patented improvements, invented, improved, and manufactured by the exhibitor; cottage ranges, with registered improvements, improved and manufactured by the exhibitor; (new implements) cottage stoves, with registered and patent improvements, invented, improved, and manufactured by the exhibitor; a grate suitable for the better rooms in farm houses and other purposes (registered), invented, im-

proved, and manufactured by the exhibitor; a cottage grate for bedrooms, with registered and patent improvements, and a combined pump, sink, and chain trap for cottage and other purposes; invented and manufactured by the exhibitor.

JAMES PITTS, of Stokeinteignhead, near Teignmouth, Devon.

(New implement) a light subsoil plough, (new implement) a horse hoe, and (new implement) a light two horse scarifier, invented and manufactured by the exhibitor.

TUXFORD and SONS, of Boston and Skirbeck Ironworks, Boston, Lincolnshire.

(New implement) a portable steam engine of six horse power, (new implement) a patent straw shaker, (new implement) a patent clod crusher roller, and (new implement) a patent land roller press wheel or clod crusher, invented and manufactured by the exhibitors.

JOHN WESTCOTT, of Thorverton, near Collumpton, Devon.

A cottage beehive, improved and manufactured by the exhibitor.

WHITMEE and CHAPMAN, of 18, Fenchurch-buildings, City; and 70, St. John-street, and 11, Ray-street, Clerkenwell, London.

(New implements) two newly invented linseed and corn crushers, and (new implement) a grinding mill for breaking agricultural produce into fine meal, invented and manufactured by the exhibitors; and a mill for grinding wheat or flour, with dressing machine attached.

JOHN AINSLIE and WILLIAM B. MOFFATT, of Perry-hill, Sydenham, Kent.

A tile making machine, invented and improved by John Ainslie; and samples of manure, manufactured by William B. Moffatt, of 9, Spring-gardens, London.

RICHARD COLEMAN, of Chelmsford, Essex.

Patent drag harrows and scarifiers, a patent subsoil harrow or pulverizer, and a patent expanding lever harrow, invented and manufactured by the exhibitor (a prize of £5 was awarded for this implement by the Royal Agricultural Society at the Newcastle Meeting, 1846).

JOHN DULEY, of Northampton, Northamptonshire.

(New implements) a very complete farm kitchen range, a large farm kitchen range, a cottage range (patented), and a small cottage range for farm labourers, invented and manufactured by the exhibitor.

WILLIAM GERRANS, of Tregoney, near St. Austell, Cornwall.

(New implement) a manure distributor, invented, improved, and manufactured by the exhibitor; a four-row turnip and manure drill, improved and manufactured by the exhibitor; (new implement) a ten-row corn drill, invented, improved, and manufactured by the exhibitor; a turnwrest plough with skim coulter, improved and manufactured by the exhibitor.

HOTGE and BATLEY, of 9, Adam-street, Adelphi, London.

(New implements) a portable double cylinder steam engine for agricultural use, and a portable flour mill, invented by the exhibitors, and manufactured by William Butlin, of Northampton.

WILLIAM HOOPER, of Chagford, Devonshire.

(New implement) a horse turnip cutter and distributor for sheep and pigs on a ley field, invented by the exhibitor.

FREDERICK HUXHAM, CHARLES HUXHAM, and JAMES ARMITAGE BROWN (under the firm of Huxhams and Brown), of Exeter, Devonshire.

A grinding mill for breaking agricultural produce into fine meal, and emigrant's flour mill, invented and manufactured by the exhibitors; a linseed or corn crusher, (new implement) a chaff cutter, a pair of millstones to grind corn, a cottage stove or range for burning coals, an economical steaming apparatus for general purposes, also as kitchen apparatus for gentleman farmer, and a water wheel model, improved and manufactured by the exhibitors.

ALEXANDER KENNEDY SMITH, of Exminster, near Exeter, Devon.

(New implements) a rotary screening machine for screening or sifting ashes, sand, gravel, earth, &c., and a wheat guillotine, for separating the ears from the stalks, invented and manufactured by the exhibitor.

JOHN SMITH, of Uxbridge, Middlesex.

(New implement) a royal Albert cultivator (registered), invented by the exhibitor, improved by General Wemyss, of Cumberland-lodge, Windsor, and manufactured by the exhibitor; an improved barley hummeller, the Uxbridge improved hand or horse power chaff engine, a winnowing or dressing machine, (new implements) the Uxbridge wrought iron expanding horse hoe, a four-horse bolting machine, a shaker for the foregoing machine, and a set of wrought iron triangular harrows, all invented and manufactured by the exhibitor.

WILLIAM TOWELL, of Bolham, near Tiverton, Devon.

(New implement) a one-way turnwrest plough for general purposes, invented and manufactured by the exhibitor.

THOMAS WEBBER, of Stoke Cannon, near Exeter, Devon.

A one-horse cart for agricultural and general purposes, a plough adapted for general purposes, improved and manufactured by the exhibitor; and a drill for small occupations, invented and manufactured by the exhibitor.

DANIEL FIELD, of Crediton, Devon.

(New implements) a plough for general purposes, invented, improved, and manufactured by the exhibitor; a plough, adapted for deep ploughing, and a one-way or turnwrest plough, invented and manufactured by the exhibitor.

JAMES LOVELL, of Glastonbury, Somersetshire.

A haymaking machine (this machine received a prize at the Bristol meeting of the Royal Agricultural Society, and a prize of £10 in the year 1842), and an apple mill, invented, improved, and manufactured by the exhibitor; (new implement) a portable double cheese press, invented by John Wright, of Glastonbury, and manufactured by John Wright and James Lovell, of Glastonbury.

THOMAS WRIGHT, of Alington, near Exeter, Devon.

A light waggon for general purposes, and a one-way plough, invented, improved, and manufactured by the exhibitor.

WILLIAM E. RENDLE and Co., of Union-road, Plymouth.

A collection of seeds, roots, &c.

THOMAS GIBBS and Co., the Seedsmen to the "Royal Agricultural Society of England," and to the Honourable Boards of Agriculture of England and Sweden, Corner of Half-Moon-street, Piccadilly, London.

A collection of some hundred dried specimens of grasses, wheats, oats, and barleys; a full assortment of various agricultural seeds, comprising Swedes, hybrid and other turnips, mangold wurtzels (sorts), white Belgian and other carrots, drumhead and other cabbages, kohlrabi, clovers (sorts), flax, furze, broom, lucerne, mustard, rape, giant and common sainfoin, tares (sorts), beans (sorts), peas (sorts), oats (sorts), wheats (sorts); samples of mixtures of selected natural grass seeds, as prepared for laying down various descriptions of land to permanent meadows and pastures; specimens of the roots of yellow or orange, globe, long red, long yellow mangold wurtzels, and samples of various other seeds.

THOMAS TAYLOR, of Banbury, Oxfordshire.

A patent inflated saddle, invented and manufactured by the exhibitor; a patent moveable panel hunting saddle, a patent side saddle, a portable winker blind, and a registered bitt for riding and driving bridles, invented by the exhibitor.

NICHOLAS LE BEIR, of the Island of Guernsey.

Samples of Guernsey butter.

CHARLES THOMAS, of Stratford-upon-Avon, Warwickshire.

Several flexible saddles (registered July 10, 1845), invented by Mr. A. Newland, of Stratford-upon-Avon, improved and manufactured by the exhibitor.

nufactured by the exhibitor; and a flexible side saddle, invented by Mr. A. Newland, of Stratford-on-Avon, improved and manufactured by the exhibitor.

GEORGE GIBBS and Co., Seedsmen, &c., to the Royal Agricultural Department of Belgium, and Corresponding Member and Seedsmen to the Agricultural Society of Zeeland in the Netherlands, 26, Downstreet, Piccadilly, London.

Meadow and pasture grass seeds; samples of mixed grass seeds for renovating old grass lands, various natural grass seeds, dried specimens of various grasses, rye grass, clovers, rape or cole seed, cabbage, Swedish turnips, common turnips, mangold wurtzel, rye, barley, oats, wheats, and tares.

ROBERT COGAN, of Leicester-square, London.

Tiles of sheet glass, rough plate tiles, manufactured by Messrs. Hartly, of Sunderland; glass for slates, slabs of rough plate for granary and other floors, manufactured by sundry manufacturers; glass milk pans, manufactured by Messrs. Hartly and Co., of Sunderland; lactometers for testing the quality to milk, manufactured by the exhibitor; syphons for drawing off milk, invented by Lord Comoyo, and manufactured by the exhibitor; and two milk trays, invented and manufactured by Messrs. Swinburne and Co., of South Shields.

JABEZ HARE, of Arundel-street, Strand, London.

A model of horse hoof, with patent shoe and fastenings, invented by William Parry, Esq., of Plymouth.

SMITHFIELD MARKET.

It is painful to witness the last struggles of an expiring reality; it is amusing to view the final throes of an expiring sham; in the latter case the persistency of the struggle is out of all comparison to the merits of the decaying system, and is only to be accounted for by other considerations. Supported in its last moments by the unwearied interest of its city friends, Smithfield market dies hard. Their expedients for stimulating its languid vitality must indeed be dictated by no ordinary affection; with all the solicitude of the doctor and the nurse, they group themselves around, and endeavour to lose the sense of approaching calamity by impossible suggestions of remedy and relief.

Smithfield-market is undoubtedly *in articulo*, but its friends will have one consolation under the bereavement—namely, that human ingenuity (of a certain order) could hardly have done more to retard the fatal hour. We say of a certain order, because it may be questioned whether the remedies suggested have been indicative of any great skill or judgment, however much they may have been indicative of zeal. As a sample, take the report just presented to the Common Council by the Markets Improvement Committee—a body who, as all our readers know, for some time filled the office of consulting physicians to Smithfield.

It would be as painful to the mass of our readers to wade through the complications of this document as it would be to unravel the perplexities accumulated by legal ingenuity upon the Gorham affair: the multitude of topics is as embarrassing as the mode in which they are arranged is capricious; the historical, the commercial, the legal, and the moral features of the case are jumbled together with a recklessness almost as surprising as the pertinacity which reiterates such a number of used-up arguments. In discussing a declaration which possesses no definite beginning or end, and no consecutive order, we may spare ourselves the labour of a connected *résumé*, and be satisfied with directing attention to its general character. Its general character is, we are glad to say, one of finality; it looks as if the Markets' Committee had exhausted the subject—as if they had brought all their artillery into the field, and were determined to make this the final struggle. Possibly they imagined that before such a threatening attitude the enemy would

turn tail; at all events, their allusion to the legal weapons with which the contest may be waged is calculated to strike terror into the opposing forces. They feel called upon, they say, "to protest against such a commission being used to affect the rights, prescriptive, chartered, parliamentary, and judicially confirmed, of the Corporation of London, they being informed that it is the clear law of England that the Crown cannot, through the medium of a commission of inquiry, legally affect the rights of the subject." The interests of landowners, farmers, graziers, butchers, yea, even of the public itself, are items not to be disallowed. If you will remove Smithfield, you will cause "a dislocation and disarrangement of the connexions of trade and commerce." We have here an instance of the way in which people's thoughts, according as they are clear or obscure, determine undesignedly the form of the expression. The calamity and the language are alike too indistinct for ordinary appreciation; but if this means simply that persons living near Smithfield and carrying on trades dependent on the market will suffer in some degree from an alteration of site, no one ever failed to perceive or pretended to deny that circumstance. The Government Commissioners, in their report, which we printed on the 3rd of last month, dwelt upon it at some length. Palpably it is not the first consideration, nor the second; but if the corporation, or the butchers, graziers, &c., are in want of some one to make common cause with them, we have no doubt that the West India planters, or indeed the Protectionists as a body will be open to any proposition which may swell their ranks or enforce the validity of their argument. As for the mischiefs which are to accrue to the public, we take it that the public is awake to them, and has magnanimously determined to encounter them.

We have no sort of objection to these irrelevancies; they are rather amusing than not. The committee, in drawing up their own document, have everything of course very comfortably their own way; and if there had never been a Government commission—if this public, whose interests are threatened, had had no experience of crowded pens and reeking slaughter-houses and over-driven beasts in the heart of a populous city—we

should have to confess ourselves *hors de combat*. As it is, we are afraid that the rejoinder of the committee, assisted by the declamatory prowess of its chairman, will not be accepted in the teeth of that experience. It is by no means necessary—it would be anything but a compliment to the more sensible classes of the community—to go over again all the sickening details of cruelty and torture inflicted by the narrow space, and defended by its narrow-souled guardians; the inconveniences, the enormities, the sanitary evils were sufficiently exposed in the report made to the Houses of Parliament, and are not insufficiently known to the world. Much of all this may be summed up in one fact which came lately under our notice, namely, that during these tropical days thousands of animals after long journeys to the scene of their torment are confined within the precincts of Smithfield-market from Sunday night till Monday afternoon, without one drop of water to alleviate the torments of their unchanged position and contracted space. But our architect, say the Market Committee, is a singularly ingenious person; he can so repartition the existing space, and that which we are prepared in the most liberal spirit to add, that the animals will have no future cause for complaint; on the contrary, they will look forward to their new accommodation as a serene and happy resting-place. Unhappily, there is a Common Councilman on the other side in this case. Mr. Norris, at the last meeting of that body which will meet again to decide this question to-morrow, announced that a bullock is by the new plan expected to revel in 1 foot 9 inches and $\frac{1}{2}$ -th of an inch of room. The same gentleman calculates that there will not be sufficient space for more than three-fourths of the expected sheep, and, by way of climax, that the total expense of these humane alterations would be £850,000! The Markets' Committee and the ingenious architect must reconsider this matter, for plainly there is no longer an option between the two courses to be pursued. The corporation say, enlarge Smithfield: the commissioners say, make Smithfield a dead meat market if you please, but let us have our *forum boarium* somewhere in the suburbs, where unlimited space may be secured at less expense than Smithfield can be enlarged for; where the access from the country may be easier both by rail and by road; where, in a word, the sums which it has now become necessary to expend for the purposes of a market may be expended in a way which will insure ample space and capacity for enlargement, obviating at the same time a multitude of inconveniences. This is the whole case. We said that this report bore some evidences of finality; we repeat it. It is the last *pronunciamento* of a defeated party, in which the sense of indignity contends for expression with the consciousness of a declining cause, in which the boldest assertion of rights is united with the faint expostulations of despondency. To rebuke the commissioners for entering into the past history of London, and for calculating the future requirements of its population—to denounce as sinister the investigations of Government—to show up the incompetencies of the Islington Market, is to exhibit a mixture of awkward resentment and irrelevant

platitudo. The real question is not touched by all this; and it can be excused on one ground alone, namely, as the exercise of an undisputed privilege, as the final growl of a threatened interest. In a final growl we can forgive asperity, we can submit to bombast, we can tolerate incoherence. — Times.

ON THE MANAGEMENT OF PLANTATIONS.

—In your Journal the arts of gardening and farming are liberally discussed, when forestry is but rarely hinted at. It is obvious that gardening and farming are rapidly progressing towards perfection, while forestry seems to be as yet but little understood, or its importance but slightly considered. Every day's experience teaches us, that every point of forestry, as it now stands, is capable of extensive improvement; and its real importance to an industrious and enterprising nation unquestionably demands the greatest attention that can be bestowed upon it for improvement. If there is any point of forestry less understood than another, it is the want of data upon which to calculate correctly the quantity of any given kind of timber that should or may be taken from an acre of land of a given quality, at a given age, upon a given altitude, soil, and situation: and relative to this point of forestry, I shall enter more particularly at a future time, and give the result of my experience. At page 425, an article appeared signed "A. B.," which consisted of suggestions for the better management of the plantations in the New Forest, Hants, in which "A. B." suggested to her Majesty's Commissioners of Woods and Forests, for improving their present system of management, to drain and trench land, intended to be planted, previous to planting trees upon it. "A. B." recommended to have a sufficient quantity of open ditches, made deep enough to leave the subsoil perfectly dry as deep as the roots will penetrate. I admit that draining is absolutely necessary for rendering ground which is naturally wet genial to the roots of trees, but not to make drains as deep as the roots will penetrate. I may state that under ordinary circumstances I have seen the roots five and six feet deep, and in some instances I am aware of their penetrating more than ten feet deep into the ground. Then, by being thus far acquainted with the depths to which the roots penetrate; it appears to me to be altogether impossible to make drains in such a manner as to correspond in depth with that of the penetration of the roots. Next to draining, trenching or digging is recommended as being of vast importance for preparing ground for the reception of young trees, because (as it is stated by "A. B.") the generality of planters have merely holes dug, and nothing done to the ground between the trees; but grass, ferns, briars, furze, or any other weeds that may happen to be established in the ground, are allowed to grow up with the young trees which will devour much food that would assist the newly planted trees; besides, from their completely covering the surface, the sun cannot act upon the soil. No doubt but to allow ferns, briars, furze, or any such rubbish, to cover the ground and grow up with the young trees, must prove most injurious to them by overtopping them

and crushing them down; but wherever I have seen trees planted by merely digging holes for them, without cultivating the ground between them, they were differently dealt with; for in such places as I have seen young plantations judiciously managed, particular attention has been paid to the trees during the summer season, so as to keep down all weeds till such time as the trees themselves would rise above the rank growth of the weeds. If ferns and weeds are allowed to grow up with the young trees, they draw the nourishment from the ground. The larches, which were growing among some of the strongest-growing ferns that I have ever seen, were, in three years after they were planted, between four and five feet long; while, in other parts of the same enclosure, where few ferns grew, the trees were comparatively much smaller.

Does this then not indicate that the ground would be impoverished because of the nourishment that the ferns, grass, &c., would draw from it, or that they would not devour so much food as would rob the newly-planted trees of the nourishment that would be necessary to them? If "A. B." thinks that it does, when the nourishment that they thus require for the first two or three years of their growth cannot be but very trifling, compared with what they will need afterwards, I would feel greatly obliged to him if he would further state whether he expects the same trees to obtain the progressive increase of nourishment that they will need till they come to full-grown timber?—DONALD MACRAE, *Under Forester, Arniston, near Edinburgh.*
—Gardeners' and Farmers' Journal.

PEAT CHARCOAL v. PEAT MOULD.

SIR,—My reply to the statement made by Professor Davy, at the Sectional Meeting of the Dublin Society, respecting the qualities of peat mould, not having fully appeared, may I request your insertion of this letter?

It has been long known in Ireland that turf mould possesses a deodorising power, as is proved by the "time-immemorial" custom (shown at every cabin door in the bog districts) of covering the house refuse, &c., with "mull," as it is termed, or bog mould. So long as the matter is covered with mould, odour will but slightly escape; but it is also well known that, when thoroughly intermixed with general house refuse, and allowed to lie for some time, fermentation invariably takes place, and noxious gases escape.

Long usage has also shown that until fermentation has actually existed for a time, evil arises by using turf mould as manure. Hence why it has for ages been the custom in Ireland to prepare the intermixture of turf mould and refuse by laying it in alternate layers, usually for a year before used. Hence also the custom, in recent years, of *roasting*, as the people term it, heaps of turf mould as manure—in fact, *carbonising* it.

It has been long known, also, that *peat ash* possesses a deodorising power, and refuse intermixed with it in sufficient quantity will *not* yield odour again.

It has been proved by a commission of the first French chemists that *peat charcoal* never gives out the gases it so greedily absorbs until drawn from it by the plant, or that the charcoal itself is destroyed by fire; and further, that it possesses strong properties of fertilization, as well elementally as mechanically. On the other hand, centuries have proved in this country and on the Continent, that there are properties in *peat highly detrimental to general vegetation*.

I would ask, then, *why should peat mould, in its natural state, with all its elements unchanged, be recommended as a promoter of vegetation?*

It is right also to state that peat mould, as a deodorizer of night soil, has been tried so far back as the year 1834, in France, and failed.

M. Salmon, a practical chemist, conceived that the

mud of the Seine would, in consequence of the quantity of animal matter deposited in it for ages, produce, if carbonised, a species of animal charcoal, of sufficient power to deodorise night soil. The powder produced apparent deodorization, but after a time the odour was yielded, and the use of the compound was abandoned. Subsequently, in conjunction with Payen, a well-known French chemist, a factory was established on a large scale, under the firm MM. Salmon, Payen, and Co., to prepare manure by the intermixture of night soil and "POWDERED TURF," which was considered then to be a perfect deodoriser. M. Paulet states, in a paper upon the subject, that M. Darcet placed some of the "powder resulting from the process in a porcelain saucer, and caused it to be circulated one evening in a salon, in the midst of a numerous society, giving it out for a certain mineral." Great was the surprise of his guests when he informed them afterwards what was the real nature of the pretended mineral. Still, although the effect was supposed to be so perfect at the time as to cause the appointment of a government commission to investigate the question generally, composed of the Prefect of Police, the Prefect of the Seine, and MM. Labarraque, Chevalier, et Parants du Chatelet, *the factory was given up within the year*—the combination produced fermentation, and a vessel loaded with poudrette for the use of the sugar plantations at Martinique took fire on her passage out, and was destroyed.

A special paper on the cesspool system of Paris, prepared for the Board of Health, within the last two years, states as follows:—"The last of these reports (alluding to those of the commission) was written so far back as 1835, and the whole of the solid produce of the cesspools of the city of Paris is still conveyed to Mount Faucon, as described in a former part of this paper, where it is manufactured into poudrette in the manner practised at the time, and which has been practised for ages before." This mode of manufacture is merely exposure to the atmosphere.

Permit me now to say that peat charcoal manure has long since been sent by me, in both sacks and barrels,

to the West Indies from London. It has been tested by the first agriculturists in England and Scotland, and proved to be at least equal to *guano*. The quantity required per acre being from five to ten cwt., which will cost say from 15s. to 30s.

Need we run risk, then, to search out a very inferior substitute for that which will, in fact, produce a cheaper fertiliser than even farm-yard manure, whilst only a few hundred weight will require carriage, in place of some 30 or 40 tons?

Every sack of peat charcoal used will support, perhaps, a family for a week; and the royal charter of the Irish Amelioration Society provides specially that after the proprietary receive six per cent. on the paid-up capital, *one-half of all the profits* shall be appropriated to advance the position of the Irish people, by establish-

ing at each station practical instructors in agriculture, &c., &c., and to provide seed for green cropping and flax culture, upon the same principle as has been established under the humane guidance of his Excellency the Lord Lieutenant for the continuance of those instructors. I do not despair that the society will ere long produce the funds.

I have the honour to be, Sir, your faithful servant,

JASPER W. ROGERS.

Nottingham-street, Dublin, 29th June, 1850.

P.S.—I refrain for the present from entering upon the assumed causes for the deodorising powers of peat and peat charcoal, and other matters brought forward at the sectional meeting, which are foreign to the present communication.—The Freeman.

PEAT CHARCOAL MANURE.

TO W. P. ANDREW, ESQ.

SIR,—I have the pleasure to send you a specimen of the peat charcoal prepared with night soil, and regret very much that you should have had occasion to remind me of my promise. You should have received it long since could I have found a safe channel for its delivery.

The cesspool upon which I tried it contained, as nearly as I can guess, about four tons of the most fetid matter, and exhaled an odour teeming with pestilence. This I immediately obviated by causing half a sack of charcoal to be thrown over the surface and around the festering sides of the brick tank, greatly to the surprise of the rustic operators. In the course of a day or two I proceeded to empty the cesspool, but having only 10 cwt. of charcoal I was desirous that the quantity should be made available to the disinfection of the entire mass of night-soil, and only employed enough to take off the most vicious part of the smell at the moment. For this purpose, I took care in the process that the surface of the night soil should always be covered with a stratum of the dry charcoal, and as a portion of that was removed with a ladleful of soil, its place was supplied with fresh charcoal, while the contents of each ladle were thrown into a large butt, and well stirred up, with the addition of a little more of the "Doctor." I had two butts, which, when full, I covered with about an inch of charcoal, and left about 18 hours, when they were emptied into the corner of a dry building, and the little offensive smell remaining removed by throwing over the heap a few shovel-ful of dry charcoal. This operation was repeated until the cesspool was emptied, and about $9\frac{1}{2}$ cwt. employed. The remaining $\frac{1}{2}$ cwt. I used to keep all safe and free from exhalation. In a fortnight I caused the mass to be well mixed by cutting straight from top to bottom, when it was perfectly free from any trace of its origin. A great deal of this I have employed upon my grass, a portion of which was manured with a compost of lime, rubbish, and vegetable mould from the adjoining ditch bottoms. The crop of hay upon the charcoaled part was at least one third better than the remainder.

The turf of which I formed my lawn was from an old meadow for many years without manure; this now, with a pretty

free sprinkling of the prepared charcoal, will rival many of the old established and carefully kept grass plots.

Early in February I planted early York cabbages; the 100 with charcoal have been all cut, whilst those planted in the ordinary way are still unfit for use.

Upon the potato its use is evidenced by the vigour and much deeper green of the haulm; it is at present too early to pronounce upon its efficacy in respect to the tuber.

In March I planted strawberries, and despite the severe frosts and subsequent dry weather those which have charcoal produce a little ripe fruit, whilst the rest are barren. Its beneficial effects upon the peas and beans are also denoted by the increased strength and deeper green of the straw, with a corresponding augmentation of produce.

I would not omit either to tell you how much gratified I am at the results perceptible upon the flower borders in the brilliancy of the scarlet geraniums and the intense pink of the roses, and among the annuals the beautiful blues of the *Convolvulus minor* and *Nemophilla insignis* are as much deepened as the flower is increased in size. The mignonette, French poppy, larkspur, and lavatera, are all in their way rendered more attractive; and I much wish that you could, as I am at this moment, be enjoying their delicious odour, and the sight of their bright and lovely colours—a pleasure I would ensure to you, would you fulfil the promise you made me of paying me a visit.

I remain, yours very faithfully,

Stanwell Moor, July 3rd.

THOS. BURNELL.

TO DESTROY RATS AND MICE IN STACKS.—

Take one pound of nitre or saltpetre, and one pound of alum; dissolve them together in two pints of well water; get a firkin of bran, and make a mash thereof, putting in two pints of the above liquid, and mixing up together. When you build a stack, every second course take a handful or two of the mash and throw upon them, till they come to the easing; allowing your stacks to stand twenty years, rats or mice will not come near them.

EMPLOYMENT OF PEAT CHARCOAL IN THE ARTS.

There is, perhaps, no subject of inquiry, relating to matters of industry, which has awakened more general interest, or given rise to more sanguine expectation with regard to its influence upon the condition of a certain class of the community, at least in Ireland, than the application of peat, on an extended scale, as fuel for domestic purposes, and in some branches of manufacture. The prominent manner in which this question has been treated by individuals, whose position is sufficiently elevated to give them credit in the eyes of the world, has probably led, in many respects, to a false conception of its true merits; at the same time, the extensive introduction of peat into use as a substitute for other descriptions of fuel, promises advantages too great to be treated of slightly. Peat, as is pretty generally known, is a substance of vegetable origin: a substance apparently still in a state of transition, still undergoing those chemical changes which sufficed, in the early ages of the world, to convert whole forests into the vast carbonaceous deposits encountered in certain localities, under the form of coal. The conversion of vegetable matter into peat is a process which, under favourable circumstances, such as the presence of moisture and the accumulation of the vegetable substance in large masses, seems to be constantly in progress; and immense tracts of peat are doubtlessly, at the present time, in process of formation. Peat is met with principally in damp marshy districts, on the borders of rivers, the course of which is impeded, so that their waters become partially stagnant; and particularly in the neighbourhood of the embouchure of great rivers, which flow through a low country. It is also encountered, in some cases, at a great height above the level of the sea—peat bogs existing in the elevated valleys of the Alps, and also in the mountainous regions in the north-western part of South America. In its natural state the use of peat, as fuel, is limited, both from its want of calorific power, and from its containing a large proportion of volatile matter, the odour of which is penetrating, and easily imparted to matters in its neighbourhood. When peat is, however, previously burned to charcoal, or, more properly speaking, to a kind of coke, it is converted into a fuel of most valuable character, nearly approaching, if not quite equal to, wood-charcoal, and the coke from coal, and possessing some qualities superior to either of them.

In a country where, as in England, an apparently unlimited supply of excellent fuel can always be obtained without difficulty, both for the purposes of manufacture and for domestic use, we are apt to lose sight, or to become regardless, of the advantages that may be found in the conversion of a substance like peat to a useful object; but it ought to be borne in mind, that the coal measures are probably not exhaustless; indeed, it has

been publicly stated, by an unquestionable authority on such a subject, that the day when England will see the end of her coal is not so far distant as we are disposed to believe; it is therefore, even in this respect, an object of interest to see the enormous tracts of peat which cover many square miles of country, rendered available to the ends of industry, even if it were only with reference to the economizing the great source of our national supremacy. With respect to the employment of peat charcoal, there are some circumstances to be considered which serve to give it a fair title to superiority over both wood-charcoal and coke; in its application to metallurgic processes, for example, particularly in the manufacture of iron, its superiority is well marked; and in many manufacturing processes, where a continued moderate heat is requisite, this kind of fuel is very much better than either coke or wood charcoal. The value of peat coke, as fuel, arises from its peculiar composition, and partly from its physical character. Owing to its being somewhat friable and cavernous, it ignites readily, and, when once lighted, burns entirely away, even when in small fragments. The amount of heat it produces in burning is somewhat less than that of wood charcoal, weight for weight; and it bears almost the same relation to coke; but it is more lasting than charcoal, and, from its chemical constitution, more suitable to metallurgic purposes than coke. Most varieties of coal contain sulphur in the form of iron pyrites, and some, sulphate of lime also, which, as well as the pyrites, is a source of sulphur, as it becomes converted into sulphuret of calcium in the process of coking. Now, in almost all metallurgic operations, the presence of sulphur is highly deleterious, as it is apt to form a combination with the metal under treatment, and so produce an injurious effect. This defect, when coke is used, attains a high pitch, unless the coke be prepared with great care and skill, so that the sulphur may be partially expelled or burned off during the process of burning; in coke prepared in retorts, or in gas making, the presence of the sulphur is an effective bar to its employment in the arts. The objection arising from the noxious influence of sulphur cannot certainly be urged against wood charcoal; but this substance possesses, when compared with the coke from peat, a physical disadvantage—from its light porous structure it burns away with great rapidity; and (although, from its purity, well suited to almost every operation in the arts) on this account it becomes too costly to be employed, excepting under circumstances in which no substitute for it can be made by coke or other fuel. At all times charcoal must be a very costly fuel, both in consequence of the limited supply of the raw material, and from the expense of manufacture. Peat coke offers a substitute for charcoal under all circumstances, and under almost all for common coke as well. Peat seldom contains sulphur in any state; and even

when that substance is present, it is in such small quantity that it is generally oxidized and expelled in the process of coking the peat.

After having been dried, peat yields, when burned, about two-thirds of its weight of coke equal to wood-charcoal; and it has been calculated that this may be produced and sold for about 35s. per ton; at which price it would compete in the market with coke from coal, and possess a great advantage in price over charcoal; in this case we suppose the peat-coke to be prepared according to the present method of burning charcoal, or of making coke from coal in ovens. Peat contains, however, a certain proportion of matters having commercial value, which, being volatile, are driven off during its combustion, and consequently lost; these are, acetic acid, ammonia, and certain volatile oils, partaking of the nature of naphtha. Seeing that these valuable matters are lost in the process of carbonising the peat in ovens, it has been proposed to carry on the process of conversion in retorts of brick or iron, to approximate the process to the manufacture of gas from coal, or that of the extraction of acetic acid and other products from wood. This idea does not however, with respect to peat, appear to possess much practical value; it is a question whether the quantity of the products above-named be sufficient to cover the increased expense of working—for, in the first place, the amount of peat-coke produced at each operation is reduced, inasmuch as the retorts must be limited in size; and, secondly, a great additional expense is incurred for fuel to heat the retorts, which, being closed from the air, require to be heated entirely from the outside; and, as a given quantity of peat requires the consumption of a quantity at

least equal to its own bulk to burn it into charcoal, it is clear that one-half of the charcoal from the whole will be lost; and is to be compensated for by the volatile products collected from that peat contained within the retort—the process being also in every way more laborious, and, consequently, more expensive. In the process of coking the peat in ovens, the peat burns itself; the volatile matters are certainly all lost, but every ton of peat yields its proportion of coke, which is its most valuable commercial constituent.

In the manufacture of iron, it is a question whether peat-charcoal may not be entirely substituted for every other kind of fuel with striking advantage to the manufacturer, with respect both to the quantity and quality of the iron produced. It was suggested long ago by Berthier that peat might be used with advantage in the extraction of iron from its ores; and he also hinted at the advantage that might be gained by mixing the pounded ore with the charcoal, compressing the whole into the size and form of bricks, and thus placing them in the furnace; the iron ore and carbonaceous matter would thus be brought into a degree of proximity that would probably much facilitate the reduction and fusion of the metal—at the same time that a fuel was employed incapable of producing upon the iron any injurious effect. The employment of a fuel derived immediately from the sterile bogs, which cover so many thousands of acres of land otherwise available to agriculture, would be itself an inducement to promote the introduction of peat-charcoal into more general use; but happily the benefit would be here as much to the arts adopting the innovation as to the agents of its production.—T. W. K., *Newton's Journal*.

SHAW'S AND CORBET'S DIGEST OF AGRICULTURAL CUSTOMS.*

It is our intention to make use of this valuable digest of one of the Blue Books of last session for the purpose of showing, in as concise a form as possible, the position of the farmer over a large portion of the country. We confess to have been exceedingly surprised at the result of the evidence which this committee has been the means of bringing together. That a large portion of England is badly farmed is admitted by every one; but that anything like so large an extent as this evidence proves to be so, we were by no means prepared to believe. There is, of course, a great diversity of opinion as to the propriety of any legislative interference between landlord and tenant, for the purpose of giving compensation to the latter for unexhausted improvement, or in other words, "*Tenant-right*." We are perfectly satisfied that, independent of any assistance from parliament, "*Tenant-*

right" may be secured by mutual agreement in all cases, except, perhaps, on entailed estates. Our surprise is, that the evident advantages of this system should not have been universally recognised; especially when the evidence shows so clearly, that want of proper security to the tenant and bad farming are synonymous and convertible terms; and that those districts, as portions of Norfolk, Lincoln, and Northumberland, which are notoriously the best farmed and the highest let, are precisely those in which leases and compensation for unexhausted improvements are the rule of practice. Apart from all political considerations, which of course have no place in this journal, the evidence is full of instruction to all; and whilst so much has been said about bad farming, the wonder certainly is—how it could be expected to be better under such bad conditions.

In the following table we have shown the information furnished by the evidence as to the various customs with regard to term of entry, term of holding, whether from year to year or on lease, compensation allowed for unexhausted improvements, &c.

* Digest of Evidence taken before a Committee of the House of Commons on Agricultural Customs in England and Wales. By SHAW and CORBET. Rogerson, London.

CUSTOMS.

COUNTIES.	Term of entry.	Term of holding.	To whom the first crop belongs.	Compensation allowed for unexhausted improvements.	REMARKS.
BEDFORD ..	Michaelmas	Mostly yearly	The entering tenant pays for turnips and hay	None allowed	The Duke of Bedford and one or two others grant leases
BERKS	The same	—	The entering tenant pays for all acts of husbandry, and takes the straw and hay at a valuation	None allowed	
BUCKS	The same	—	The same	None allowed	
CAMBRIDGE.	The same	—	The entering tenant	None allowed	
DERBY ...	Lady-day	—	The entering tenant	No compensation allowed for draining; but bones, if unexhausted, are paid for	The time for which an allowance is made for bones extends over six years.
DEVON	Lady-day and Michaelmas	No leases	The entering tenant	None allowed	The manure is sold by auction by the outgoing tenant.
DORSET	Lady-day	—	The outgoing tenant	None allowed	
DURHAM ..	May 13	Mostly from year to year	The outgoing tenant	—	The first rent is not paid until the tenant has been one year in possession.
ESSEX.....	Michaelmas	Yearly	—	None allowed	The outgoing tenant is paid by the incoming tenant for the dung-fallows. The tenant constructs the buildings, the landlord finding the materials. Rents paid quarterly.
GLOUCESTER	Some Lady-day, others Michaelmas	Yearly	The entering tenant	None allowed	
HANTS	Michaelmas	—	—	None allowed	The entering tenant takes possession of the fallows at the Lady-day previous to entering, and prepares his own turnip crop.
HERTFORD..	Michaelmas	Yearly	—	—	The same as in Hants.

(CUSTOMS—(Continued).)

COUNTIES.	Term of entry.	Term of holding.	To whom the first crop belongs.	Compensation allowed for unexhausted improvements.	REMARKS.
HEREFORD..	February 2	Yearly	The outgoing tenant has the wheat crop	None allowed	
KENT	{ Oct. 11 or } { Sept 29 }	Yearly	—	An allowance made for draining and coppice	
LANCASHIRE & CHESHIRE	The land on Feb. 2, and the house at May	Yearly	The outgoing tenant has the wheat crop	None allowed	
LEICESTER..	Lady-day	At will	The incoming tenant	None allowed	
LINCOLN.... (Wolds)	Lady-day	Leases	The outgoing tenant has the wheat and barley	For chalking bones, claying the light soils	The landlord pays for tiles, but not to exceed £14 in one year
MIDDLESEX	—	Both from year to year and leases	—	—	
NORFOLK ..	Oct. 11	Leases	Custom varies	—	
NORTHAMPTON	Lady-day	No leases	—	—	The outgoing tenant is paid for ploughing, &c.
NORTHUMBERLAND	May 13	Few leases, except in the north	The outgoing tenant has the away-going crop	None allowed	
NOTTINGHAM	Lady-day	—	The same	Very little allowed except for bones, rape-cake, &c.	The tenant erects the building upon wooden posts, so as to remove them upon the expiration of his tenancy.
OXFORD	Michaelmas	—	—	None allowed	
SALOP.....	March 25	Mostly from year to year.	—	None allowed	
SOMERSET..	Upon dairy farms Mar. 25; in others Michaelmas	Yearly	—	None allowed	
STAFFORD ..	Lady-day	Yearly	The entering tenant has one-third of the wheat after a fallow, and one-half after green crops.	None allowed	

CUSTOMS—(Continued.)

COUNTIES.	Term of entry.	Term of holding.	To whom the first crop belongs.	Compensation allowed for unexhausted improvements.	REMARKS.
SUFFOLK ..	Oct. 11	Eight years' leases.	The entering tenant pays rent and taxes on the fallows, and for acts of husbandry	None allowed	The entering tenant has also the hay at a valuation.
SURREY	—	Yearly	—	Draining allowed for, over ten or twelve years	According to what is called " <i>the full custom</i> ," the outgoing tenant is paid for dung, lime, sheep-foldings, acts of husbandry, and rents and taxes of fallows
SUSSEX	Sep. 29	—	—	The incoming tenant pays for acts of husbandry, and for underwood, &c.	The above customs, in some cases, extend to Sussex
WARWICK ..	Lady-day	Leases are very rare	The outgoing tenant generally disposes of it to the incoming tenant	Bones allowed for Drains are allowed for, if within three years.	
WILTS.....	Pasture at Lady-day, arable at Michaelmas	—	The entering tenant comes in and prepares his own wheat crop and turnip land.	None allowed	
WORCESTER	At all the different terms	Few leases	The last crop belongs to the outgoing tenant		
YORK (<i>East Riding</i>)	Lady-day	Yearly	The outgoing tenant has the crop of about one-fourth of the arable land, and pays rent for that alone	None allowed except a trifle for oil-cake.	
YORK (<i>North Riding</i>)	The same	The same	The same	None allowed	
York (<i>West Riding</i>)	—	—	The outgoing tenant is paid for working fallows		

It would be difficult to place agriculture under more short-sighted, ignorant conditions than some of the above customs, many of which have, according to the evidence, been fixed before the use of artificial food or manures was known; and yet these customs have still the force of law! No leases granted, along with no compensation allowed for unexhausted improvements, are the best possible guarantees for bad farming. The tenant farmer who assigned as a reason for his bad farming to one of the witnesses that he had expected his landlord to die almost every day during the last seven years, is a type of too much of the farming in England. But whose fault is this? and who suffers most by such management?—the tenant, who has only one year's interest in the estate, or the landowner, who must have at least a life interest in it?

It may possibly be objected that the tenantry are unable and unwilling to make further improvements. Let us see what the evidence says on this point, as well as on the extent to which improvements are necessary.

In Hampshire, Mr. Owen assures us that with security the tenant would risk his capital, and that a tenant from year to year cannot, as a prudent man, do so.

In Bucks, the clay land is stated to be much in want of drainage.

In Cambridge, the lands held from year to year are badly cultivated.

In Devonshire, where no leases are granted, it is usual in many places to take as many crops as the land will bear, and then leave it till nature restores its fertility. Farmers are, however, quite ready to do better, if they could only get security.

In Dorsetshire much more would be done if there was only security.

In Essex, as soon as ever a farm is taken on lease, there is a great improvement, and some of the land would grow half as much again, if there was only security and proper cultivation.

In Gloucester, the vales suffer dreadfully from wet; and yet the tenants would drain fast enough if there was only security. Some of the land is only producing one-third of what it is capable.

In Hereford, a great extent of land requires draining; if that were done, witness says the produce might be doubled.

In Hertford, the farms on lease and those from year to year, could be distinguished by a stranger. In one township, of which the former are $\frac{1}{4}$ th, and the latter $\frac{3}{4}$ ths of its extent, Mr. Lattimore states "There is as much stock kept on the $\frac{1}{4}$ th as there is upon the $\frac{3}{4}$ th, there is double as much stock fattened on the $\frac{1}{4}$ th, and there is 58 per cent. more labour employed on that $\frac{1}{4}$ th, and there is one-third more grain produced on it per acre."

In Kent, Mr. E. C. Hughes says the cultivation would be even better than Lincolnshire, if proper security would be given. "Portions of the county, in consequence of security being given, have become the best cultivated, from being the very worst."

In Lancashire, the drainage has been followed by the use of bones, and one-third more cattle can be kept upon land so managed.

In Leicester, if proper security were given, drainage would at once be done. A great extent of land requires it.

In Northampton, the soil is said to be capable of producing one-third more than it does at present.

In Northumberland, Mr. Ramsay and Mr. Crisp are both of opinion that, if proper security were given, the land would be improved to the utmost.

In Shropshire, with security, "all farming operations would be set about with more earnestness, and carried through with more determination than can prudently be done now."

In Somerset, "the old system still exists of three white crops, and then laying the land down to grass for two or three years."

In Suffolk, Mr. J. G. Cooper thinks, that if payment for unexhausted improvements were made, the employment of labourers up to the expiration of the lease would be secured.

In Warwick, the outlay of capital is checked by the feeling of want of security.

In Wiltshire, the agreements have never been altered since wheat, barley, and natural grass, was the only known system of cultivation.

In Yorkshire (*North Riding*), the course of cropping is two white crops and fallow, under which the land gets poorer every year.

In Yorkshire (*East Riding, Holderness*), the above rotation is also followed.

"Of all the official inquiries lately granted, few promise to be more really serviceable in their results than that made by the Committee on Agricultural Customs. However desirable, and however well attempted, none but the power of parliament could have compared the cultivation of one district with that of another, in the strikingly efficient manner it has now been done. The above evidence furnishes the history and the requirements of agriculture upon the evidence of fifty men instead of any one; their several testimonies, moreover, being taken and tested with a perhaps more than neutral impartiality, that must make every fact established still more valuable and deserving of attention." Upon these grounds, then, we think the above extracts, showing the capabilities of increased production, and wish for improvement amongst tenant farmers, worthy of the most serious attention. The

case is, if possible, made still stronger by a comparison with the system of farming in Lincolnshire, where leases and payment for unexhausted improvements are universal.

"In Lincolnshire, some fifty years ago," says Mr. Brown, "we were in a wretched state. *In the Wolds, the produce has been doubled, and artificial manures are now applied to every crop.*"

It is strange in the nineteenth century to be told by one of the witnesses, that he does not think one-tenth of the land in Great Britain is held under lease.

There is some difference of opinion amongst the gentlemen examined, as to whether a lease, or merely payment for unexhausted improvements, is the most preferable way of letting land. A few only advocated what we consider to be the best—a combination of the two systems—namely, a long lease, with arrangements for the last four years of occupancy.

It appears that, as the law now stands, except where it is arranged by special agreement, or a very clearly-defined custom, no tenant can claim compensation for improvements; nor is the law at all clear as to what fixtures or erections the tenant can remove.

We are surprised to see that it is the opinion of some of the witnesses that as much as two-thirds of the land is tied up by family settlement, by church holdings, or encumbered by mortgages. With regard to land held under family settlements, the recent Drainage Acts have afforded facilities for improvements in draining; though whether they reach the church lands or not, we are not certain.

As an example of the way in which allowances are made for chalking, marling, or claying, which are considered permanent improvements, the following table is given by Mr. Harding:—

Years.	Acres.		1849	1850	1851	1852	1853	1854	1855	1856	1857	1858
			£	£	£	£ s.		£ s.		£		£
1849	50	at £2	100									
1850	50	do.	..	100								
1851	50	..	..	..	100							
1852	25	{ 4th year dropping 1-4th to landlord. }	25			50						
			75									
1853	..	do.	25	25	..	..	None.					
			50	75								
1854	25	do.	25	25	25			50 0				
			25	50	75							
1855	..	do.	25	25	25	12 10			None.			
				25	50	37 10						
1856	25	do.	..	25	25	12 10	..	..	..	50		
					25	25 0						
1857	..	do.	..	..	25	12 10	..	12 10	..	..	None.	
						12 10		37 10				
1858	10	do.	..	..	..	12 10		12 10				20
								25 0				25
												50

Claim to the outgoing tenant £95

With regard to allowances to be made for lime, bones, guano, oil-cake, and such like, as illustrating how long these manures are supposed to act, we quote the following opinions:

1st. Lime lasts four years, says Mr. Chandler. Not more than two years, says Mr. Pinches. Three or four years, another witness thinks. Five

years, says the witness from Notts. Six years, Mr. Kilby (Leicester) thinks, ought to be allowed for lime.

2nd. "For bones, guano, and chemical manures, when no corn crop has followed, the whole to be paid for. One corn crop, half the expense. Two corn crops, nothing."—*Mr. Chandler's evidence*

Mr. Ramsay thinks no allowance should be made for guano.

Another witness states that he has seen the benefit of bones after seven years, but never allows more than four.

For oil-cake, it is calculated that one-third of the expense should be paid by the incoming tenant.

In addition to the above important subjects, some incidental information is given on the advantages of breaking up inferior and undrained grass land. On this point landlords are proverbially tenacious. Certainly as much so as when no other source of hay was known.

Without any wish to allude to the evidence in a political point of view, it furnishes matter for the most serious thought, that such a large portion of

the country should be so badly farmed; and that the advantage of liberal covenants between landlord and tenant should be so little known, is indeed surprising. To both landowner and tenant, the digest of the evidence is of importance; to the former as showing the advantages which other owners have received by liberal management; and to the latter, as having half of the bargain to make, it shows him the advantages which his brother farmers in other districts have reaped under proper business-like security. Those landowners who still persist in managing their estates according to the customs of their ancestors, are more to be pitied than blamed, as they inflict a severer punishment on themselves than any Act of Parliament could possibly attempt.—*Journal of Agriculture.*

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(*From the Morning Chronicle.*)

THE MINES AND MINERS OF CORNWALL.

LETTER XI.

Long before Roman, Dane, Saxon, or Norman put his foot as a conqueror on British ground, Cornwall was both known and frequented for its mineral wealth. The earliest celebrity which the country seems to have attained in this respect was for its tin; but subsequent mining operations have proved it to be also rich in copper and lead. It likewise possesses iron, but not in very great quantity: whilst silver is found to a small extent in the lead mines. For many centuries the tin produced in Cornwall was extracted from mere diluvial ores, or superficial deposits, it being only within a period comparatively recent that the system of mining was commenced which has since developed itself on so stupendous a scale. The county was long known for its tin ere copper was extracted from it to any extent. But although this branch of the mining industry of Cornwall was the most recently developed, it is now the most extensive of all, the copper mines being the most numerous, and employing the greatest number of hands in the county.

The ores of Cornwall, whether of tin, copper, or lead, are found in veins. These veins are called lodes. They run in very irregular lines, varying greatly in width, but all resembling each other in this respect, that no limit can be assigned to their depth. The two great features in the geological structure of the county are the granite and the slate stone. In the granite the tin is generally found—in the slate stone the lead; and the copper usually at or near the junction of the two. In parts, these different ores are found by themselves, in other places they are mingled together. Thus, from a particular lode, copper, tin, or lead only may be extracted—or copper, tin, and lead may be found in different proportions together. Copper and tin are frequently found in one and the same lode; and

when they are not so, the different lodes in which they may lie are sometimes so close to each other as to be within the bounds of one and the same mine; so that whilst one shaft of a mine may descend into a copper, that contiguous to it may penetrate a tin lode. It is thus that many of the mines particularly in the west, are worked both for copper and tin.

The mining interest of Cornwall is, beyond all question, the most important in the whole county. The number of people employed in and about the mines, including surface and underground workers, was, in 1841, upwards of 27,000. On a calculation similar to those made on former occasions with respect to the number of persons dependent for support upon agricultural labour in particular districts, this would give about 87,000 persons as the number dependent upon mining operations for their subsistence. The importance of the mining interest will be appreciated when it is considered that it supports nearly double the number of people maintained by agricultural labour in Cornwall. It is next to impossible to get at the number at present occupied in and about the mines; yet there is reason to believe that, though the population of Cornwall will show an increase of nearly 40,000 within the ten years from 1841 to 1851, the number of those employed in and about the mines, and dependent on such employment, will not exhibit any very great increase. Indeed, but for the recent opening of the mines in the neighbourhood of Liskeard, and the activity with which mining operations are there at present pursued, the probability is that their number would have decreased.

In regard to mining, Cornwall is divided into three great districts—the western, the midland, and the eastern. The western comprehends the parish

of St. Just and its neighbourhood. The midland has a larger range, extending from Hayle on the east, to the parish of St. Blazey, near Fowey, on the west. Fully one-half of this district is wild, uneven and bleak, and scarcely adaptable for the lowest agricultural purposes. Its chief *foci* are St. Agnes, Camborne, Redruth, and St. Austle. The eastern district comprehends the mines in the neighbourhood of Liskeard, and those at Callington, on the borders of Devon. In all these districts, copper, tin, and lead abound in varying proportions, the copper being generally in the greatest quantity, except, perhaps, in the neighbourhood of St. Austle. Lead mines are worked to a limited extent in the neighbourhood of Liskeard; the chief mining operations in that quarter, however, being confined to copper.

As the main object of the present inquiry is to ascertain the condition and prospects of the labourer I shall confine myself to a brief account of the practical working of the mines, with a view to the elucidation of the miner's duties, and of the different circumstances which more or less affect his lot and fortunes. Before doing so, it will be as well to premise that the term miner exclusively applies to those actually working in the mines—the capitalists, or those employing the miner, being known as the adventurers. Each mine is owned by a company of adventurers, the capital being divided into shares, which are marketable and transferable like those of a railway company.

To explain the process of mining, it is advisable to begin with the beginning—in other words, to follow a mine from its first establishment, until it is in complete and active operation.

The lodes generally manifest themselves, more or less, on the surface. But, even when the indications of ore are greatest, it requires a practised eye to distinguish them, for frequently the richest ores give the least token of their presence to the inexperienced observer. When there is reason to believe that a lode worth trying exists in a place not hitherto worked, a set of adventurers form themselves into a company for the purpose of working it. In doing so their first business is to apply to the lord of the soil for a licence to work the lode for a given time—sometimes for six months, but generally for a year—upon trial; the lord to receive a specified proportion, usually one-fifteenth, of the ore which may be raised during the period of the licence. The lord also comes under an obligation, should the adventurers at the expiration of the licence be disposed to continue the working of the mine, to lease it to them for a certain number of years, generally upon the same terms as those of the licence, so far as his share of the proceeds is concerned. Should the project prove a failure, it may be abandoned at any time before the expiration of the licence. This mode of paying the lord his dues is objected to by many, on the ground that it frequently operates harshly upon the adventurers. They urge that however much the mine may be losing, the lord is always sure of a profit. Thus, if £15,000 worth of ore is raised and disposed of, it may cost the adventurers £15,000 to raise it. If in that case they paid the lord his fifteenth, the company would lose £1000, instead of making a

profit. But this would be equally the case were the lord, instead of his share of the proceeds of the mine, to receive a fixed money rent from the adventurers. Thus, if the fixed rent were £2,000, and the produce worth £15,000, as in the case supposed, the loss to the adventurers would be £2,000, instead of £1,000. It is quite true that, by the present arrangement, the lord is always sure of a profit because he runs no risk; but that profit, like the profit of the adventurers, fluctuates with the price of copper, and when the price is low, the present bears upon them more lightly than any other arrangement would do.

The course here mentioned is that which is pursued when it is in contemplation to open up an entirely new mine. But it frequently happens that a new mine is opened within bounds already set out to a company of adventurers, and within which they are already working a mine. In such case no new licence is, of course, required. When a new mine is thus opened, the way is generally led by a party of miners, who undertake to try on the "tribute system," which will be immediately explained, either what they believe to be a fresh lode, or a portion of the lode already worked, but which the existing operations are not likely to reach. In the latter case the result, if the experiment is successful, is generally the sinking of some new shafts, which are soon connected with the existing works, whereby the scope of the existing mine is only enlarged. But whether an entirely new mine is to be opened, or the range of an existing mine is only to be enlarged, the operations commence by the sinking of shafts, and the construction of levels; these must be done ere the mine is in workable condition. And this brings us at once in contact with the actual work of the miner.

The miners are divided into two great classes—the surface and the under-ground men. The latter are by far the most numerous, being fully 3 to 1, as compared with the former. The under-ground men are again divided into two separate classes, known, in mining phraseology, as the "tutmen," and "tributers."

The tutmen are those who do "tut" work, which is neither more nor less than simple excavation. In commencing a mine, therefore, the tutmen are the first called into requisition. They sink the shaft and run the levels—all the ore which may chance to be raised during the process belonging exclusively to the adventurers, always with the exception of the lord's dues. The work is given out by the fathom; it is regularly bid for, and the parties offering to do it for the lowest price secure the work. It generally happens, however, that one of the captains of the mine ascertains beforehand, as far as can be, the nature of the work, and sets his own price upon it—the price at which it is taken seldom varying much from the captain's price. Both tut and tribute work are usually taken by what is called a "party;" the party, in both cases, consisting of several individuals, their number varying according to circumstances. The party is divided into gangs, which relieve each other in rotation. There are three gangs to a tut party, each gang working eight hours at a time, the whole 24 hours being thus turned to account. The gangs

employed in the work are strictly required to relieve each other at the proper time. As their work is chiefly preliminary to the real business of mining, it is of course the object of those who employ them to have it done as speedily as possible. Nor are the interests of the tutmen themselves interfered with by this—for, as their work is piece-work, the sooner they get through it the better. A greater degree of discretion is generally given to the tributers, as to how long they may work, and when they may relieve each other—it being supposed that they have sufficient inducement to diligence in the share which they have in the proceeds of their own operations. At the poorer mines the work is generally confined to ground which is not metallic, tribute work having reference invariably to metallic ground. At times, however, the work embraces ground which is metallic—but this is always in the richer mines. When the ore is known to be good it is raised at so much per fathom, in which case it all belongs to the adventurers. It is generally work of a more speculative kind that is set on the tribute system; and it is because in the poorer mines all the work is of this kind, that the whole of the ore is raised on that system. But even when it is raised on the other system, that is to say by the work, it is not unusual to give the men employed a small interest in the ore produced. This is done in order to make it their interest not to waste or spoil the ore.

The work of the tutman is, as already said, that of simple excavation, at so much per fathom. He bids for it with a real or presumed knowledge of the nature of the ground to be worked—the same knowledge being possessed, or presumed to be possessed, by the captain assigning him the work. Miscalculations in this respect are not unfrequently made, which are in their results sometimes in favour of, and at other against, the tutman. Although their work has not so much the character of a gambling transaction about it as has that of the tributers, still it is not entirely free from that objection. He may bid for work, and it may be assigned to him, on the supposition that the ground is hard and difficult to be operated upon—or the same may be done on the contrary supposition. In the one case it may be found, after a little trial, much easier, and in the other much more difficult to work, than was anticipated. Thus, by the chance of his work, he may be a gainer to some extent, or a severe sufferer. Thus, after taking work which appears easy at a comparatively low price per fathom, he may, after penetrating for some distance through disintegrated granite, which is easily removed, or soft clay, come to a hard mass of granite, which opposes a serious obstacle to his progress. This the tutman calls a “pebble;” and it is a serious question with the party, on discovering it, whether they will change their course to avoid it if possible, or dash right through it, in the hope that it does not extend to any great depth. There is risk in either case, as the time lost, and the expense incurred, in attempting to turn or avoid it, may be much greater than was anticipated. Nor is it always that it can be avoided at any cost. Then, again, if they attempt to go through it, their hopes may be disappointed, as its depth may be

very great. Sometimes, after going through it for some distance, they give it up in despair, and attempt to turn it, which they find, to their mortification, after having lost so much labour, that they can rarely do. When the work goes thus against the tutman, he very soon complains; and if his complaint is well grounded, a favourable modification is generally effected in the arrangement between him and his employers.

The undertaking of the tutman is to bring to the surface so much matter, whether ore or “stuff,” or both together, at so much per fathom. To fulfil it, he requires the use of machinery to raise the matter excavated to the surface. That which he thus employs is, of course, the machinery on the spot, adapted for the purpose and appertaining to the mine. For this he is usually charged at the rate of 14s. a fathom, which is so much to be deducted from his earnings. There are other deductions also to be made; but as these are common to both tributers and tutmen, their explanation will be deferred for the present.

The first work with which the tutman grapples is, of course, the sinking of the shaft. The object is, if possible, to have the shaft perpendicular. Such a shaft is not only the most convenient, but it is also attended with the least expense in the future working of the mine. But much in this respect depends upon what is called the “underlie” of the lode. It is very seldom that the lode is perpendicular, its inclination being, as it proceeds downwards, generally to the north. If the underlie is not great, the shaft may to a considerable distance follow the lode. If it is great, the shaft descends, not in one continuous line, but, as it were, by a succession of steps. It will be sunk perpendicularly by several fathoms at a time, the lode all the time diverging from it to the northward. At certain distances halts are made, and horizontal courses run in the direction of the lode, until it is again struck. Each time the lode is struck the shaft is sunk again, the lode to be reached again by a horizontal course as before. As the shaft is being sunk, the levels are being constructed. It is necessary that the reader should comprehend what these are, as on his doing so will greatly depend his comprehension of the operations which follow. To enable him the more readily to understand the internal arrangements of the mine, let us suppose both the lode and the shaft to be perpendicular.

The lode, be it remembered, is neither more nor less than a crevice or fissure in the granite or in the slate, or at the junction of the two, varying in width and generally running from east to west. This crevice is usually filled with disintegrated granite, clay, or other soft matter, interspersed with which is the metal. Were the lode perpendicular, the shaft, in following it downwards, would be perpendicular also. The shaft is usually in the form of a parallelogram, about five or six feet wide, and about double that in length. The sides are almost invariably secured with woodwork, so as to prevent them from falling in. Down the middle, and dividing the parallelogram, as it were, into two squares, runs a strong wooden partition, which in reality makes two shafts of it. One is for the raising of the ore and rubbish; the other is that by

which the miners have access to and egress from the mine. The levels are parallel courses, which diverge on either side from the shaft, and follow horizontally the course of the lode. These courses are at different distances from each other, but, generally speaking, they are not more than ten fathoms apart. Thus, after the shaft is sunk a certain distance, the first level will be run—in other words, a horizontal passage will be cut from either side of the shaft, following the direction of the lode. The height of this passage is usually from five to six feet. It is also commonly three feet wide, so as to give room for the operations to be conducted within it. This is its width, however narrow the lode may be; nor is it frequently made any wider, even when the lode is wider, unless the lode is sufficiently rich to warrant its being made so. There is no limit to the length of the passage or canal, but such as may be set to it by the superficial bounds of the mine. The shaft is then sunk, say for ten fathoms more, when similar levels are constructed, directly under those alluded to. This operation may be repeated so long as the mine continues sufficiently wealthy to induce the adventurers to keep sinking the shaft and constructing new levels. Some mines have attained a depth of 300 fathoms, so that they have about thirty different sets of levels, all ranging one beneath the other. When a new level is wanted, the shaft is first sunk to the proper depth, when the level is opened up. The *rationale* of a mine under these circumstances would be neither more nor less than a perpendicular hole sunk in the lode, with a series of horizontal holes projecting into it, at regular distances from each other, from either side of, or at right angles to, the perpendicular one. It is obvious that, when the lode is not perpendicular, which is usually the case, and the shaft, instead of being continuous, descends, as it were, by steps, the levels, instead of being directly under each other, will be below, but a little to the side of each other—the distance to which they will be to the side of each other depending upon the inclination or underlie of the lode. Thus, if the lode underlies to the northward, each successive level will be more to the northward than those above it, and less so than those below. Generally speaking, instead of the shaft following the levels, and so being broken into different sections, it is sunk perpendicularly, being accessible to the different levels by means of horizontal curves connecting them together.

When the mine is extensive it is usual to sink several shafts. Thus, at the Carn-Brea mine, which has a superficial extent of a mile and a-half in length, and about three-quarters of a mile in width, there are from 20 to 30 shafts. Other mines have even more than this. These shafts are often situated along the line of the lode, and are constructed to facilitate the operations of the mine, which would be much impeded were there but one outlet, when the levels have been pitched far back. When several shafts are thus situated the levels extending from one will run into those extending from another, so that the different levels will thus have the advantage of more than one outlet. Several shafts are sometimes sunk when the mine is very deep and the underlie considerable, not in

the direction of the lode, but in that of the underlie, so as to perforate the body of the lode at different points. These are mainly intended to facilitate operations in the lower levels, which would otherwise be too far removed from the outlets of the mine. When the mine is deep and the shafts are far apart, the levels are here and there connected with each other by what are called “winzes.” A winze is a cutting extending from one level to another, and when perpendicular, which is not always the case, is just like the section of a shaft extending between level and level. This has the double object of facilitating the communication between the different levels, and of improving the ventilation of the mine. Sometimes, despite the presence of numerous winzes, the circulation of air is so imperfect in a mine, that boys are employed below in working machines which increase the current.

The description of the internal economy of a mine would be incomplete without an allusion to what is known as the adit level. This is found in mines which are situated on the side of a declivity, and its chief object is to prevent the necessity of having to raise the water pumped from the mine to the very top of the shaft. The adit level may be the first, second, or third level of a mine, counting from the top, the depth at which it is run depending partly upon the depth of the valley upon which it opens, and partly upon the nature of the portion of the mine above it as to whether it is wet or dry. Thus, if a mine is situated on the side of a valley, and the shaft is sunk about 100 feet above the lowest level of the valley near the mine, the adit level may be run out into the valley about 90 or 100 feet down. Through this the water will escape, and the expense of raising it to the top will be saved. The adit level is also useful as an auxiliary to ventilation.

These observations apply equally to copper, lead, and tin mines; and everything here described is necessary to be done before the mine is in working order. And all this is exclusively the work of the tutmen. It does not necessarily follow that ore has been raised during the operations, although considerable quantities are sometimes brought to the surface in sinking the shafts and running the levels. It is not until these are completed that the real work of mining begins. The levels are then taken possession of by those whose business it is to produce the ore. When the lode is very rich, the tutmen, as already explained, are engaged to work it at so much per fathom. But the production of the ore is generally the work of the tribute man, who is after all the real miner.

From the explanation here given, it will have occurred to the reader that between every two levels on either side of the shaft a deep belt of the lode intervenes. Thus, between the surface and the first level there is such a belt, as also between the first and second levels, &c. That between the first level and the surface is seldom worked to any great extent; but the others are, according to the richness and quality. These intervening belts are, in the jargon of the miners, called “pitches,” and it is by the pitch that the work is set.

Each mine has its own regular setting days, and the process of setting is as follows: At the proper

time and place the tributers and the captains of the mine meet together. I may here explain that the captains are invariably men who have risen from the rank of miners. It is their duty to set and superintend the work; to do both of which properly they must frequently descend into the mine. There are three or more of them, according to the extent of the mine, and one or more of them are invariably below. The setting is a species of auction, the captains being the auctioneers, the miners the bidders, and the pitchers the subject-matter of the transaction. Since the previous setting-day more pitches may have been opened, either by the further sinking of the shafts and the construction of additional levels, or by the extension of the levels already existing. It frequently happens, too, that pitches already partially worked but abandoned may be offered. In such cases they may be taken by different parties, or by the same parties at a higher rate. Both miners and captains are supposed to have a knowledge of the quality of the pitchers, and it is upon this knowledge that they proceed to business. The pitches are put up, one after another, not to the highest, but to the lowest bidder. There are maps of each mine, and the pitches, levels, shafts, and winzes, are all as well known to the parties concerned as are their streets to the denizens of a town. Pitch so and so is put up, and the bidding commences. The offer, on the part of the captains, is to set the lode to the party that will work it for the smallest share of the proceeds. This explains the position of the tributer, and the character of his work. He does not work for fixed wages, or for so much per fathom, but becomes, *quoad* the portion of the mine which he engages to work, a partner, as it were, in its profits and losses. The share in consideration of which he will work a pitch depends upon his belief as to the quality of the lode at that particular point. Thus he will offer to work a rich pitch for 5s. in the pound—that is to say, for 5s. out of every pound's worth of ore which he may raise to the surface. This is called his tribute. To work a poor pitch, however, which yields but little ore to a great deal of labour, he may ask as high as 13s. in the pound. Sometimes he will work at a lower rate than 5s.; but when the ore is so rich as to tempt him to go much lower than that, the adventurers generally give it out on tut by the fathom, retaining all the produce to themselves. Between 4s. and 13s. in the pound is the range at which the tribute man generally works. It is seldom that there is any indiscriminate bidding, or any great scramble at the settings. Men who have obtained a footing in the mine have generally the preference over strangers. The captain has generally his price for each pitch, and if it is a new setting for the same pitch, he usually offers it to the party who have already worked it. If they take it, the matter so far is at an end; if not, it is then put up, and the lowest bidders, before a stone which is thrown up falls to the ground, receive the work.

The pitches are set for two months at a time, an arrangement advantageous to all parties; for if the tributers find a pitch poorer than they anticipated, they are not obliged to work it for a greater length of time; whereas, if it turns out much richer than was expected, the adventurers will be enabled, at

the end of that period, to secure their fair share of the produce. The tributers have this further advantage, that, should they find the pitch very poor, they may throw it up at the end of a month, although they have taken it for two; and in such a case it may be reset to them at a higher rate.

I have already intimated that, in setting the pitches and giving out tutwork, a preference is usually given to those who have been established in the mine, provided they are disposed to take the work at or near the captain's price. This preference has given rise to the practice of taking "farthing pitches," as they are sometimes called—that is to say, taking a pitch at the low and merely nominal tribute of a farthing in the pound. The object of doing so is simply to get established in the mine. At the next setting those parties will be on the same footing as those who preceded them in the mine. But advantageous as this appears to be to the adventurers, it is not in reality so. Beyond getting established in the mine, the men have no inducement to work, their tribute being merely nominal. The consequence is that they waste their time, doing little or no work whilst below, to the obvious detriment of the adventurers. This is now so clearly seen, that in most mines the system of farthing pitches has been discontinued, the adventurers having been all the more inclined to depart from it, from the umbrage which it frequently gave to those who had been long in their employment.

When a pitch is set, it is marked down in the books of the mine as set to such and such a party. Their names or marks are all subscribed to the notification. The party varies in number, according to the nature of the pitch, and the quantity of labour which will have to be expended upon it. Sometimes the party does not exceed four, at other times it consists of six or eight, and occasionally extends to twelve.

The share of the tributer is determined as to its amount by the value of the ore when ready for market. He has, therefore, not only to extract it from the lode, but also to prepare it for market. This is done on the surface by those whom he employs for the purpose. At every mine there is a large number of surface workers, amongst whom may be seen some men, but the majority of whom are women and boys. They constitute from one-fifth to one-fourth of the whole number employed in and about the mine. These surface workers are almost all in the pay of the tributers or underground men. It is their business to take the ore as it comes from the shaft, to have it stamped, cleaned, and washed, and prepared for the smelters. The larger masses are broken with hammers, generally by women, until the whole pile is in pieces about the size of a large egg. If the ore is very rich, it is then carried to the rollers, between which it is crushed. It is then ready for market. This applies only to the copper ore, which is considered good if it has from 10 to 15 per cent. of metal in it. The preparation of the tin ore is very different. It often comes to the surface with no more than 6 per cent. of metal in it. But before it is ready for market, and in a state fit to be received by the smelters, it has to be "worked up" until it contains 75 per cent. of metal; in other words, the great bulk of

the dross must be got rid of. The ore is first taken to the stamps. These are perpendicular beams of wood, set in frames, each beam being shod at its lower end with a large and heavy mass of iron. In one stamping-machine there may be a great number of these beams. They are raised alternately by a cogged cylinder driven by the steam-engine, and fall with great weight upon the rough ore, which is placed below them, and which they grind very fine. The ore when placed below them is immersed in a stream of water, whose only outlets are fine wire sieves, close to the lower end of each stamper. Through these sieves the water is forced with great violence, carrying out with it such parts of the ore as have been sufficiently crushed to pass through. Such as is not small enough remains below the stamper until it becomes so. As the crushed ore passes from the stamper it is carried by the water to beds, which slightly decline towards one end. The best part of the ore sinks immediately at the upper end of these beds, the dross not sinking until it reaches the lower end. This dross still containing some metal is again washed, by being divided into other beds similarly situated, and the process is resumed until little but dross remains. In this way the tin ore is worked up to the requisite quality of 75 per cent. When the copper ore is not very rich, it also is put under stamps, and undergoes the process of washing. There are other operations, such as "jigging," &c., all having in view the preparation of the ore for market. It is when sold, after it has been so prepared, that the tributer's earnings are determined, in ascertaining the net amount of which he has of course to deduct the wages of those employed by him on the surface for the preparation of the ore. Nor is this the only deduction which has to be made, as will be presently seen. The tin ore is not thus prepared at his cost, being generally bought of him at the top of the shaft, the adventurers working it up to the requisite point.

Before considering the miner's wages, it will be as well to see him at work. To do so, if the reader will accompany me, we will descend a shaft together.

The mines are not equally wet, but no one can expect to penetrate very far into a mine and emerge dry from it. We have, therefore, to go to the "shifting-room," and attire ourselves in a miner's garb. It consists of a suit of thick flannel, with a stout coat over it, heavy shoes for the feet, and a hat generally made strong enough to "bear a good knock." We must also provide ourselves each with a candle. The candle is stuck into a piece of clay, which again is stuck upon the hat, which is of the "wide-awake" shape. Thus equipped we descend the ladders. As we approach the shaft we perceive a steam rising from it. This, we are informed, is the breath of the men at work below. The very mine itself seems to breathe: there are at least 600 men at work beneath our feet, at various depths, some 100, some 500, and others 1,600 feet. The ladder is very narrow, with iron bars, and is well nigh perpendicular. The bars are moist and greasy from the men passing frequently up and down, which makes us cling all the more firmly, considering the unknown depth of the shaft, and the almost per-

pendicular position of our means of descent. We bid adieu to daylight almost by the time we have reached the first level. There is no one at work in it, so we descend to the second. We pass it and several others until at length we reach the seventh level. We are then about 400 feet under ground, a sufficient depth to bury St. Paul's. We take the level to our right, and pursue it until we reach the men at their work. Their is a tramroad along the level, for "running the stuff" to the shaft, so that it can be raised to the surface. In some of the smaller mines this is done by boys with wheelbarrows, which, with the exception of working the ventilating machines, is the only purpose to which boys are put below. We proceed about 100 feet in a horizontal course, when we come upon the miners. When they take a pitch, they generally work it *up*, not *down*—that is to say, the men working from the seventh level work up towards the sixth, not down towards the eighth. Their object is to follow the lode and extract the ore from it, disturbing as little of the non-metallic ground as possible. When the lode is wide enough, they work nothing but the lode, leaving the matter on either side untouched. A miner will thus work in a lode only 18 inches wide; but if it is narrower than that, he has to clear away some of the "country"—which is removing a sufficient quantity of the granite, slate, stone, or other substance which may envelop the lode, to enable him to follow it. Those upon whom we have come are engaged at this work. They are preparing to clear away the granite by blasting it. The hole for the powder is made with a "borer," held by one whilst the other strikes it with a large sledge hammer. The latter is in a state of profuse perspiration, whilst the other is shivering with cold. They are both completely wet, as indeed we are ourselves. The man with the hammer has nothing on but his flannel trowsers. The beatings of his heart, which are quick and strong, strike painfully upon the ear. He seems to be galloping through life—and so he is, for the miner is generally but a short liver. We leave this part of the level, and take that on the other side of the shaft, which we follow for a considerable distance, until we come to a hole, through which we have to crawl on all fours. We then find ourselves at the bottom of a winze, which we pass and pursue the level. The men have worked up for a considerable distance, making stages for themselves as they rise into the lode. The ore is carefully separated from the stuff, and is carried over the tram-way to the shaft. Such is the merest outline of the work which the mine exhibits. Space will not permit me to go into details here. We return again to the surface. But to climb a series of perpendicular ladders, reaching as high as St. Paul's, is no joke. We take about half an hour to do it, resting at the different levels as we ascend. We arrive at the top utterly exhausted, and thankful that we have emerged again into daylight.

Such is the position, and such are the circumstances of the miners when at work. They generally relieve each other every eight hours, each gang working eight out of the twenty-four. Their tools are chiefly the sledge, the borer, and the pick, with the last of which they remove the dislodged granite

and other stuff which do not require blasting. I one day overtook a tributer making for one of the mines near Redruth. He told me that he worked in the 300 fathom level—that is to say 1,800 feet below the surface. His engagement was to be on the ladders by six in the morning, and he emerged from the mine about five in the afternoon. Nearly two hours were spent in descending and ascending the ladders. At this period of the year, with the exception of the Sundays, his life is one perpetual night. The temperature was so high in his level, that they all worked naked, ascending, every hour or so, to several fathoms above them, to dip themselves in some pools, which were comparatively cool. He was a tributer, and the tributers look with as great contempt upon the tutmen, as the tutmen do upon the surface labourers. Indeed a tributer will be on the point of starvation before he will take tutwork. Some mines, like the Carn-Brea mine, employ about 1,200 people; others more. The Caradon and other mines which have recently sprung up in the neighbourhood of Liskeard afford subsistence to about 10,000 people, including the miners and their families.

It is not very easy to get at the earnings of a miner. The wages of the surface-workers are fixed and known, but the earnings of the underground workers depend as to amount upon so many circumstances, that it is difficult to ascertain them. Throughout the midland mining district, particularly around Redruth, which is the centre of the most extensive mining district in the county, they have been receiving for some time past from 45s. to 50s. a month. At the Caradon mines the earnings are, on the average, about 10s. per month higher than those in the west. When these mines were established a large migration of miners took place from the west, for whom no adequate house accommodation has since been provided. They are thus not only compelled to huddle together in large numbers, but they have also to pay very high for the wretched accommodation afforded them. Many of them have left their families in the west, and cannot remove them, owing to the scarcity of cottages near Liskeard. They are consequently saddled with the expense of two establishments. In addition to this they have not the advantage of allotments of ground, so common in the west, in cultivating which they could employ their leisure time, of which the miner has a great deal. All these disadvantages have necessitated a higher scale of wages in the east than in the west.

The wages, or earnings, are paid once a month; but, to keep the miners and their families going, a portion is paid on account once a fortnight. This is called their "subsist," or more commonly "stist." This is objected to by some, as tending to make men lazy. Where the farthing-pitch system is in vogue, it works very badly. In such cases the men are not entitled to anything till the end of the first two months, and they do not get their subsist until a fortnight before the day on which they are entitled to their earnings. The consequence is, that they work for six weeks without receiving anything. They are thus driven by their circumstances to go into debt with the re-

tail dealers for the necessities of life. Once in debt, it is very difficult for them to get out of it, and reckless habits frequently supervene. The wages paid to the surface workers are 8d. a day to women, and from 4d. to 6d. a day to boys and girls. At Caradon the women had, a short time ago, 1s. 3d. a day, but their wages have since been reduced to 1s.

Connected with almost every mine is a sick club, or benefit society of some kind or other. For the payment of 6d. a week to the club, a miner, when ill, or labouring under the consequences of an accident, has the benefit of good medical attendance. If he pays 1s. 3d. a week, he is entitled to such attendance for his family as well as himself, in addition to which he gets a certain weekly allowance, if he is detained from work by illness or an accident. The miners have no option as regards these clubs, the adventurers requiring them to join them. Indeed, a deduction on this account is made from their earnings. There is also a forge attached to each mine, at which the tools used by the miners are sharpened and repaired. For such work as they may have had done at the forge a deduction is also made on pay day. There is likewise the barber of the mine, who shaves the men, another deduction being made on this account. Further deductions are made for the candles, gunpowder, and so forth, which they may use when at work below. The number and variety of their deductions may be taken from the following list, which I find in an account now before me:—Subsist and barber, doctor and club, candles, powder, hilts, fuse, rope, cans, nails, shovels, locks, paper, barrows, canvas, smith cost, trimming, wheeling, dressing and labour, tonnage, tramping down, stems, and spales.

One of the greatest evils attending the employment of the miner is the speculative character which it assumes. His whole life is spent in a species of gambling. If his "take," as he calls the proceeds of his pitch, is good, he may make £100 in a month; but if he has a series of bad takes, he may work for months without earning anything—nay, more than this, he may all the time be getting in debt, not only with tradesmen, but with the adventurers, for the supply of such articles as he uses in mining, and the value of which is deducted from his earnings. It is the fitful character of his earnings that justifies the remark made to me by one very competent to decide, that where one hears of a tributer having 14s. or 15s. a-week, it is seldom that he can be put down as so well off as an agricultural labourer with constant work at 10s. When men get inured to it they cling with tenacity to a life of excitement, and such is the life of the tributer. Considering its many disadvantages—the length of time for which it may be worse than unremunerative, and the inroads which it makes upon health—the wonder is that it is pursued at all. The counterbalancing element to all these acknowledged drawbacks, in the tributer's mind, is the great gain that is sometimes made. The circumstances under which the miners thus earn and receive their money impart a general recklessness to their character. Some of them have sufficient forethought and self-control to lay by in their day of prosperity what

enables them to meet without difficulty a series of unlucky adventures. But the bulk of them are too apt to spend their money as fast as they get it—sometimes revelling in abundance, and at others suffering the very extreme of privation. As a class, they would be much better off if regular and fixed wages could be given them; but, owing to the difficulties attending the supervision of work in the mines, such a course is deemed impracticable.

The captains must be shrewd, active men, well acquainted with the practice of mining, for the miners are sometimes inclined to be lazy, and at others to play tricks. The amount of work done by the tutman is generally easily ascertained by the quantity of stuff brought to the surface. But if he is not well watched, he is apt to pretend that the ground offers more impediments than were anticipated, with a view to a favourable modification of his bargain. The tributers are also prone to make very unfavourable representations of their pitches, in order, if possible, to raise the amount of their tribute. Thus, they will send to the surface the poorest part of the lode, representing it as the best, as evidence that their complaint is well grounded. To counteract such devices the captains must be constantly on the look out. There is a trick called "kitting," to which the tributers sometimes resort. When a pitch supposed to be bad is taken at a high rate of tribute, say 13s., and one supposed to be good at a low rate, say 5s., they are apt to transfer a portion of the ore of the rich pitch to the poor one, when it is sent to the surface, as coming from the poor pitch, and the high rate of tribute, instead of the low rate, is paid upon it. The gain by this is divided amongst those concerned in the imposition.

The house accommodation of the miners is, generally speaking, of a very inferior description. It is worse in the eastern mining districts than in those of the west. In the extreme east, the evil is being partially remedied by the liberal policy pursued on the Bedford estates. Until lately, it was not generally supposed that there was much overcrowding in the midland districts. But many startling revelations in respect to this have recently been made by the house-to-house visitation of the different local boards of health. Taking Redruth as a centre, and describing around it a circle with a radius of five miles, there will be found a larger proportion of good cottages amongst the tenements occupied by the miners than elsewhere in the county. Many of these, generally the best of them, have been built by the miners themselves—that is to say, by such of them as have been provident enough to save money for the purpose. The worst tenements in this district are the older cottages, which can be easily distinguished from the others by their mouldy walls, small windows, and thatched roofs. Many of the modern cottages are well built, being two stories high and well lighted. They are usually covered with slate. Their position, too, is better selected, with a view to health, than has been that of the older cottages. But the advantages of room and good position are in too many instances counterbalanced by the numbers which crowd into the best of the cottages as well as the worst. I was told by a member of the local

board of health for Camborne that he knew of a case in which fourteen slept in one room, some of them being members of the family, and the rest lodgers in the house. On my asking him how many beds they had to sleep on, his reply was that "the room was all bed." The rent generally paid for a cottage is from £3 to £4, exclusive of potato ground. Such as build for themselves can procure a good stone cottage, with four rooms, for from £40 to £50. They have generally a piece of ground attached to it, to occupy them during their spare time. Many such houses have been built by the miners in the neighbourhood of Penzance. Of these, numbers are now deserted and tenantless, their owners having emigrated, some with and others without their families. So anxious were the men to get away, that they have in many cases left the houses which they themselves have put up at their own sole cost.

The miners, as a class, sacrifice, to a great extent, their domestic comforts to their inordinate love of dress. This failing has long characterized them, but within the last few years it has greatly increased. The increase is attributable to the greater ease with which they now procure the materials for dress—"tally-men," or peripatetic dealers, perambulating the country in all directions, selling to them goods at high prices, but taking payment by weekly or monthly instalments. To see the miners, both men and women, at church on a Sunday, or enjoying themselves at a fair at Redruth, one would not suppose that there was much distress of any kind amongst them. Most of the men are attired in fine broad cloth, whilst the women parade their finery. But many who come out covered with broad cloth, or arrayed in flaunting flounces, emerge from holes and dens more resembling pigstyes than human abodes.

I was not prepared to find the diet of the miner so poor as it generally is. I have seen many instances, in all the mining districts of Cornwall, of families living in great comfort, having a good and spacious house to live in, and a sufficiency of nourishing food to consume. The children, too, in such cases, are generally sent regularly to school. But, in all these cases, I found that the husband was a prudent saving man, who kept his small account at the savings bank, and that the wife was a good manager, thrifty, and attentive to her household duties. Much depends upon management. Some families get on very comfortably on 50s. a month, with which others cannot manage to escape great privation. The love of dress greatly affects the miner's diet. This is frequently but a coarse unleavened paste, with, perhaps, a few pieces of turnip, or an apple or two enveloped in it. Sometimes he has neither the turnip nor the apple in it, having nothing but the heavy paste to eat. Occasionally it is sweetened with a few raisins or currants. Numbers of them seldom taste meat; indeed, many have told me that they have been for weeks together without partaking of it. In many such cases, however, their own improvidence is chiefly to blame. Such as work underground during the day take their pasties with them to the mines. If they are at work not far from the surface, they ascend about the dinner hour, and have

the pasties heated for them at the forge. When they are two far below to do this they eat them cold. The surface workers have half an hour generally allowed them for dinner. Those underground eat when they please.

As has been shown to have been the case with the fisher, the loss of the potato has also been a great blow to the miner. Whether a tutman or a tributer, he generally works but about eight hours a day, and has thus a great deal of spare time on hand. It is, in more respects than one, of the utmost importance that this spare time should be well employed. So long as the potato succeeded, the spare time of the miner was, in perhaps the majority of instances, well employed. If he had not a garden attached to his house, he generally rented a piece of ground, which he applied to the production of potatoes and other vegetables. These holdings varied from an acre to two or three acres of land, and were generally leased to him for three lives. In some districts where the land had not been cultivated before, he would have a piece of waste land and enclose it, and thus reduce it to cultivation. A great deal of the surface of Cornwall has been thus reclaimed, and a large proportion of Lord Falmouth's present rental is derived from land originally reduced by the miner. The miner was thus always secure of a good supply of potatoes and other vegetables, for the climate of Cornwall is admirably adapted for the production of vegetables of almost all kinds. The quantity of potatoes which he produced was frequently not only sufficient for the consumption of his family, but also for the feeding of one or two pigs. When he killed his pig, which he generally did about Christmas, he would sell enough of it to enable him to buy another young pig or two, sufficient being still left to supply some animal food to his family. When he killed two pigs, which was not unusual, he would sell enough to enable him not only to buy two other young pigs for the succeeding year, but also to pay the rent of his plot of ground, so that the remainder of the pork, and the potatoes and other vegetables which he had for the use of his family, were all so much clear profit to him. The extent to which this enhanced both his own and his family's comforts may be easily imagined. In addition to the employment of his own spare time, it also gave employment to his wife and children. The chief advantage of this was, that, in many cases, it enabled the parents to send the children for some part of the day to school. But it was also advantageous to the adventurers and the public. The miner, when certain of a sufficient supply of potatoes and other vegetables to fall back upon, in case of a temporary suspension of his money receipts, was far more adventurous in prosecuting the discovery of new lodes. A very high rate of tribute is generally given in such cases, and miners have frequently thus realized their luckiest adventures. If, for instance, a miner had reason to believe that, in a certain place not yet worked, a lode existed which would pay for the working, he would offer to try his luck, at a tribute of, perhaps, 13s. in the pound. If his judgment was correct, for the month or two for which the arrangement lasted he would realize considerable profits, and establish for himself a

claim to constant employment in the lode which by his enterprise and acumen he might thus add to those already worked by the adventurers. If he failed, he lost his time and his trouble; but still he was not destitute, inasmuch as he had his potatoes and other vegetables, and his pig or pigs, to fall back upon. He was not thus absolutely dependent from month to month for subsistence upon his money wages, as he is too generally at present. It is this dependence that prevents him now from taking his chance in this way, for, in the majority of cases, if he were to run the risk and fail, he would be rendered absolutely destitute by the loss of his time and the stoppage of his wages. It would be erroneous to suppose that the cultivation of the potato has been altogether abandoned. The prospect of its again succeeding, is likely to restore confidence in it, and it is probable that, in the course of a year or two, its cultivation will be as successful, and its consumption as great in Cornwall, as it has heretofore been. This will effect great changes for the better in the condition of the miner and his family.

I was so unfortunate as to stumble upon St. Just when all work was suspended in the parish. This I regretted, as I was anxious to witness the operations carried on in the stupendous mines situated in this district, whose shafts, as it were, overhang the sea, and whose levels project far beneath it. The annual feast of the patron saint of the parish was being observed when I visited it. This ceremony is common to all the western parishes of Cornwall. In this instance it commenced on the Sunday, when the religious part of the ceremony was performed. For the three following days the parish was the scene of a miniature carnival. From 75 to 100 bullocks were slain for the occasion, which gave about 5 lbs. of meat for every person—man, woman, and child—in the parish. Of course, during these days no work was done. Thursday would also be a *dies non*. On Friday some would return to work, but the great bulk would make a week of it. After this, the parish would return to labour and sobriety, and think no more of the saint until the next return of his festival.

The miners are by no means a long-lived class of men. Their employment is such that the strongest constitution will, ere long, feel its pernicious influence, and break down before it. There are diseases peculiar to their work, which only a small proportion of the miners escape, provided they continue at it for several years. The two great exciting causes of disease are impure air and climbing the ladders. The miners when at work have occasionally to encounter all kinds of pernicious gases; but those most frequently met with are carbonic acid, sulphuretted hydrogen, and carburetted hydrogen. The first is the invariable product of respiration and combustion. Sometimes as many as 600 people will be at work at one and the same time in one and the same mine. The respiration of so many in a mine, never too well ventilated, must soon contaminate the atmosphere. Many mines, too, be it remembered, are never without large numbers of people in them. The quantity of gunpowder used is also another means of rendering

the atmosphere impure. There are two atmospheres which the miners dread—the “cold damps” and the “poor airs.” Of the latter there is a modification known as the “hot poor air.” They are constantly wet whilst at their work, and subject to great and sudden changes of temperature. At one moment they may be in a profuse perspiration, and at another subjected to a cold and chilling draught of air. From all these causes they are extremely liable to impaired respiration and fatal diseases of the chest. You can almost tell how long a miner has worked under ground from his pale and emaciated look. Some of them attain a green old age, but these are almost invariably such as have abandoned their underground employment after adhering to it for years. If they pursue it for fifteen or twenty years, the chances are that their average life will not much exceed thirty-eight years. Even without the impure atmosphere of the mines, the climbing of the ladders would of itself be sufficient to superinduce serious disorders of the heart and chest. The heart is in a state of high palpitation when the miner reaches the top of the shaft, whilst the lungs are in violent exercise. It is no wonder, seeing that sometimes they have to climb ladders four times the height of St. Paul’s. Dilatation of the bronchial tubes is a disease very common to them. In some mines machines have been invented to supersede the necessity of this laborious mode of descending into and ascending from the mines. These machines, however, can only be used in perpendicular shafts. The want of space prevents me from here describing them. The miners are also liable to many accidents. They seldom fall down the shafts, most of the accidents which happen being the result of careless blasting. These are now greatly provided against by the use of the patent safety fuse.

The present generation of miners are deplorably deficient in education. The number of those who can read or write is very small. But few of the rising generation attend any school but the Sunday school; and a large proportion do not attend even that. There are schools enough in the neighbourhood of the mines; but the children are in most cases put to work as soon as they are able to earn anything. At the Caradon mines I was informed

that not one-half of the children could write, whilst not much more than four-fifths of them could read, even imperfectly.

The mining population of Cornwall is generally of the Methodist persuasion. In many of the mines the captains are their preachers. Many of themselves are office-bearers in their respective churches, which has a great effect in keeping the whole body in order. They attend church very regularly. I regret, however, to say that I did not hear the best account of the morals of the miners. Early marriages are very common with them. The number of petty crimes is very great, particularly in the west, but fluctuates very much. It is generally greatest after orgies such as I witnessed at St. Just.

I have been compelled, by want of space, to hurry over much on which I could have greatly enlarged. There are other topics—such as the “ticketing system,” by which the ore is disposed of to the smelters—to which I might have adverted, had space permitted, bearing as they do, more or less, upon the condition of the labourer in the mines. But I must postpone these for the present.

On the whole, I do not regard the condition of the miner as so good as that of the fisherman. The fitful nature of his earnings, and the gambling tendencies of his employment, beget, in too many instances, reckless and extravagant habits, which reduce him, as regards physical comfort, to the level of the agricultural labourer, although his yearly receipts may be double those of the man employed in the fields.

Although not exactly miners, I cannot conclude this letter without a passing allusion to the workers in the china-clay pits between Bodmin and St. Austle. The clay, which they extract from the wild district between these two points, is disintegrated granite. They produce it by washing from the pits, and send it off to the potteries in blocks as white as snow. The streams of the district are of the colour of milk, from the washings which flow into them. As a class, the people who prepare the clay are not well off. They are a cleanly set, but their wages are generally low; whilst the house accommodation of two-thirds of them may be inferred from their miserable huts, which the traveller perceives strewn over the heathy plain.

(To be continued.)

AGRICULTURAL STATISTICS.

It seems very probable that another session of Parliament is about to pass over without any steps being taken to obtain a system of agricultural statistics. A promise was made, early in the session, that something should be done; and the reasons now not being so cogent for postponement as they were last year, when financial difficulties were so pressing, we had a hope that something this year would at least have been attempted as an experiment; but the lateness of the session now forbids the remotest hope of this being accomplished.

Now we are not sure that more difficulties are not apprehended as to the practical working of any

known mode of obtaining correct information, than any expense or any obstacles of a legal kind; and we believe if practical men would agree on a clear and simple plan, the Government are ready to carry it out. As to the machinery for working it, nobody need fear anything; but the possibility of that machinery being applied to obtain accurate information is much more questionable, and we fear that this will deter our Government from grappling with a proceeding which they fear may turn out a failure.

Amongst the many parties who have stepped forward to face this difficulty is a well-known, sound, and practical writer—Mr. Dudgeon, of Spylaw,

who, in the current number of *Blackwood's Journal of Agriculture*, has developed a plan, which he promises will attain the end at a very trifling expense; and in the course of his observations, he makes some very lucid and accurate remarks on the great uncertainty of all our agricultural statistical knowledge, and demonstrates, we think, that it is impossible to place any reliance upon it whatever.

Taking the produce of corn, for instance, he assumes that McCulloch falls into the error of supposing that nearly two-thirds of the whole arable land is annually in corn-crop—which is manifestly erroneous. That authority taking our arable land in England and Wales to be twelve millions of acres, assumes that they produce annually 29,450,000 quarters of all kinds of corn. Scotland yielding 7,377,500, and Ireland 20,450,000, gives a total for the United Kingdom of 57,277,500 quarters. Taking consumption of the population as a datum to calculate upon, and test the accuracy of this statement, he (Mr. D.) shows, that assuming the population at the time the table was compiled to be 27 millions, and deducting also for seed-corn, grain malted and consumed by cattle, the amount would be—

Wheat as bread	16,000,000
Oats consumed by man	10,000,000
Barley eaten	4,000,000
Barley malted	5,200,000
Barley distilled unmalted	1,200,000
Consumed by horses and cattle ..	21,000,000
Seed	7,900,000
Quarters	65,300,000

Thus he makes out that we have the discrepancy of upwards of eight millions of quarters between the calculated necessary wants of our population and the estimates of the produce of the entire kingdom by our best authorities, and which he shows importation has not made up.

He further applies his remarks to the cattle, and shows how utterly unable we are to approximate towards accuracy in our estimates of these in any way whatever, and shows the ridiculous anomaly of now trusting data as old as the tour of Author Young in 1779.

His object appears to be, in remedying this state of things, to obtain for the Government an estimate of the number of quarters of corn, head of cattle, &c., in the kingdom at some specific period, and either annually or occasionally, as in the case of the population census, to have an account collected of the number of the cattle, sheep, &c., and the acreage and produce of corn.

His machinery is as follows: A schedule, of which he gives a form, and which is very precise and elaborate—too much so, we fear, to be generally filled up—which he proposes should in the first week in November be sent to the clergyman of each parish, who should select two or more "intelligent individuals, well informed in agricultural matters and the practice of husbandry within the parish, to assist him in filling up the details:" these to be returned to an officer to be appointed to each county, who should prepare and condense these lists, and return them to the Government, to be then undertaken by the Board of Trade the same as

the papers on trade and navigation. The reason for selecting November is, that an accurate estimate may be made of the probable productiveness of the crop.

The expense he makes out to be £50 per annum for each county, or £4,000 for Great Britain. The heads of enquiry are very numerous, but we cannot avoid giving them to show the precise nature of Mr. Dudgeon's idea of the enquiry—

Table 2 embraces—Annual value of Land: Gross rent or value; Parochial and local burdens, per cent.

Agricultural population: Number directly employed (permanently)—men, women, and boys; (occasionally)—men, women, and boys: Total.

Horses directly employed in agriculture, number.

Grain consumed on the farm (query farms) by horses, cattle, &c.; seed and farm labour, qrs.

Improvements: Usual extent of holdings, acres;

Extent of land thoroughly drained; Foreign and extra manures used, in tons—lime, bones, guano, chemical substances purely.

Table 1 contains—Distribution of land, in acres; Produce per imperial acre.

And we ask, beyond curious facts and data what object is to be gained by an investigation so difficult, so abstruse, so inquisitorial? Who are to be expected to take the trouble and give the time for £50 per county? The remuneration will not be anything like half-a-crown per person employed, and there are thousands of parishes where no person competent to enter into such an investigation can be found even if they were willing. Mr. Dudgeon might possibly in his own neighbourhood—in the educated northern division of the island—accomplish it; but we venture to say that anything like a general return would be impossible, and to make it at all useful *general* it must be. Who, for instance, would venture to calculate the gross rental of a parish, and calculate the labourers employed with such fine distinctness? and how estimate their neighbours' purchases of lime, bones, and manure? Much more, how could they fish out the exact acres growing any particular crop, or any estimate of the yield in bushels of corn, and in tons of turnips and potatoes? How ascertain the number of their neighbours' *disposable* flocks and herds?—the number sold? the quantity also disposed of, of butter and cheese, and of wool? We think the idea preposterous and impracticable.

If information is to be had, if it is needed, let each poor-law union in England and Ireland have a *competent valuer* of the growing crops in July or August. Let him make a personal inspection, and let him report; and thus before November the Government would have an estimate by a set of practical men, which might guide and assist them, and which would be of real value; while Mr. Dudgeon's plan would leave them groping in the dark till December, when it might be too late to avert any calamity which might arise from a nation's ignorance, similar to the panic of 1847-8.

With what he says of our ignorance, and of the necessity of doing something, we quite agree; but we are equally persuaded that Mr. Dudgeon's plan will not practically meet the difficulty.—Gardeners' and Farmers' Journal.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
June 21	30.21	30.16	56	76	63	W., W. by N.,	lively	fine	sun	fine	dry
22	30.20	30.22	54	78	65	W. N. W.	lively	fine	sun	fine	dry
23	30.27	30.20	56	78	68	Wly., E. to S.	gentle	fine	sun	fine	dry
24	30.26	30.20	60	75	68	Easterly	lively	fine	sun	fine	dry
25	30.20	30.06	59	79	65	Easterly	lively	fine	sun	fine	dry
26	30.00	29.88	59	78	66	Easterly	lively	haze	sun	cloudy	hint of rain
27	30.00	30.00	58	72	58	Easterly	lively	cloudy	sun	fine	shower
28	29.80	29.68	56	72	63	Oppos'd curnts	lively	cloudy	sun	fine	shower
29	29.68	29.86	56	68	55	W. by North	gentle	fine	sun	fine	dry
30	29.91	29.95	48	67	60	W. by South	lively	fine	sun	fine	dry
July 1	29.91	29.80	56	67	57	W. by South	lively	cloudy	sun	fine	dry
2	29.84	29.93	50	66	56	W. S. W.	lively	fine	sun	fine	dry
3	29.79	29.90	53	70	57	S. West	strong	cloudy	sun	fine	rain
4	29.84	29.90	55	64	53	W. S. W.	fierce	cloudy	cloudy	fine	much
5	30.06	30.15	49	65	55	West	lively	fine	sun	fine	dry
6	30.17	29.84	49	65	57	S. East	gentle	fine	fine	fine	dry
7	29.70	29.94	53	63	52	N., N. by E.	variab.	cloudy	cloudy	fine	shower
8	29.98	30.01	48	67	56	N. West	gentle	fine	sun	fine	dry
9	30.03	29.95	49	66	55	W., N. Wly.	brisk	cloudy	sun	cloudy	rain
10	30.02	30.03	46	67	57	W., W. by N.	gentle	fine	fine	cloudy	dry
11	30.03	30.09	51	69	59	W. by North	calm	fine	cloudy	cloudy	dry
12	30.10	30.05	52	72	58	Westerly to E.	gentle	fine	cloudy	fine	dry
13	30.07	30.00	50	72	64	E. N. E.	lively	fine	cloudy	fine	hint
14	30.05	30.03	58	70	62	E., Variable	lively	cloudy	sun	fine	dry
15	30.00	29.95	57	78	70	E. by S. by N.	lively	fine	sun	fine	dry
16	29.95	29.92	63	82	71	Variable, S.W.	lively	fine	sun	fine	dry
17	29.91	29.89	63	78	68	Variable, N.W.	gentle	haze	cloudy	cloudy	hint
18	29.91	29.95	60	74	63	Every way	calm	cloudy	cloudy	fine	showers
19	29.98	29.94	58	64	60	N. W., N. E.	calm	cloudy	cloudy	cloudy	showers
20	29.92	29.93	57	64	60	E. N. E.	calm	cloudy	cloudy	cloudy	showers
21	29.95	29.95	58	70	62	S. by E. by W.	gentle	cloudy	fine	fine	dry

ESTIMATED AVERAGES OF JULY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.30	29.39	76	48	61

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
70.84	54.745	62.792

WEATHER AND PHENOMENA.

June 21—Sunny and oppressive. 22—Very hot; deep red sunset. 23—Cool air after hot forenoon. 24—Brilliant. 25—Light cirrus clouds in the evening. 26—Thunder and oppressive heat. 27—Rain in the preceding night; a shower. 28—A shower; much cooler. 29 and 30—Fine; heat decreases. No solar spots seen of late.

LUNATION.—Full 24th day, 2h. 10m. afternoon.

July 1—Light black clouds. 2—Fine. 3—A hint of rain. 4—Copious supply for hours. 5 and 6—Fine, not sunny. 7—One shower. 8—Fine. 9, 10, and 11—Dry; very cool. 12 and

13—The cold of the mornings abate; spots on the sun reappear since the 8th. 14—Black rays from a cloud near setting. 15—A hot, clear, superb day. 16—Masses of cumuli dispersed at sunset. 17—Clouds; dry; thunder for some hours; only a few drops. 18—Gentle rain before noon; heavy thunder at 5 p.m. 19—Showery day. 20—Moist, with some showers. 21—Pretty fine and sunny.

REMARKS REFERRING TO AGRICULTURE.—

The earth was very dry, till the thunder showers on the 17th and 18th, and those, with us, were far from copious. The turnip lands were in a defective condition as to moisture; and even now the balance is by no means restored. Still, no one can find fault, for the crops of hay, fodder, and corn are superior. The last change colour rapidly, and I have seen barley and oats approaching to ripeness. A few more hot days, and then some soaking showers for the bulbs would place agricultural produce in a very superior position.

Croydon.

J. TOWERS.

CALENDAR OF HORTICULTURE.—AUGUST.

RETROSPECT.

From the 16th of June to the 26th, forenoon, the weather was dry and sunny; very warm in the day-time and evening, but cool in the early morning. During this period the barometer was high, averaging above 30 inches. On the 26th the wind changed; thunder occurred, which produced a continuous roll between 4 and 5 o'clock p.m., but unaccompanied with rain. In the west, the storm is understood to have been severe and scourging to the crops. July had not—to the tenth—witnessed one summer-like day: the mornings very cool, and, in some places, with frosty rime on the grass; the weather unsettled; wind often boisterous from the south-west, occasionally showery, but in the south-east of Surrey to no extent. In fact, our grounds and fields want moisture, scarcely six inches of rain having fallen during the first half of the present year. If 24 inches be taken as the customary average of the whole year, we are already minus by fully one half. Perhaps we may anticipate a wet autumnal equinox, and a very showery, early winter. At present our crops are fine, potatoes beautifully healthy. Some fruits—particularly strawberries—abundant to profusion, and extremely cheap. More remains to be said at the close of this calendar.

VEGETABLE DEPARTMENT.

Some seeds remain to be sown, and these require attention, for more reasons than one. Unless in decidedly wet summers, August is often very dry, and then the ground is parched. In that case, sprinklings on the surface effect nothing; the air is not in a vaporous condition; or if it be so to a certain extent, the atmospheric moisture is derived from evaporation; hence, water sprinkled on the surface is carried rapidly away, and takes with it more of the ground-moisture than would pass off of itself, if it had not been artificially stimulated. I therefore again remind the domestic gardener to *soak* with soft pond-water for three successive nights the plots intended to be sown, covering them with sound mats during the whole of the days, if rain do not fall. On the third evening, the seeds are to be sown in drills of a fitting depth, and at proper distances. Water being given along the drills, and the covering-earth put on, the mat or mats are still to be applied by day, till the seeds fairly break ground. This efficient process of

watering was taught me by a very able gardener in Buckinghamshire, who had retained one noble situation for about 30 years. He knew what he was about; and I never witnessed a drougthy season, wherein—if his process was thoroughly carried out—any of the sowing failed for want of moisture. I may add, that gentle evening waterings, after vegetation first appears, will not be given in vain, when the ground shall thus have been effectually prepared.

The seeds to be sown are—first, York, Vanack, and Penton cabbage, for *coleworts*, directly, if not already done; second, the same in the second week, or to about the 10th day (3 or 4 days earlier in the north), for spring cabbage, to be transplanted once or twice, as occasions suit; third, winter spinach (preferring the broad-leaved Flanders variety) in the first or second week—choose a piece of loamy mellow ground, open to the winter's sun. Green, curl-leaved *endive*, *cos*, and brown Dutch *lettuce* at the same period, and the lettuces again before the end of August.

Transplant Cape *broccoli* early, for winter and spring use, and *savoy*s about the middle of the month.

It is usual to transplant all broccoli plants in the flat ground, trusting for winter security to earthing-up, or laying the heads sloping to the north, at a future day. I prefer, and have frequently recommended, trench-planting, as offering adequate security. Let the trenches be a foot wide, and at least six inches deep, the bottoms thoroughly dug and enriched, the earth to be placed ridgewise on each side. The distances at planting are to be the same as on the flat; and as frost approaches, after the plants have attained their average growth, each can be moulded-up like celery, till the stems be covered to the base of the lowest leaves; the slope to the north can also be very readily given during the progressive earthing-up.

Cauliflower is the opprobrium of amateur gardening. Few private persons can obtain plants to compete with those produced in the great, wholesale way. The seed ought to be sown about the last week, for plants to stand the winter, as seedlings, and to furnish the supply of cauliflowers in the spring and early summer. It will be prudent to sow twice, in an open bed of not very rich earth to be transplanted in September, in which month

further notice will be taken of the secondary operation.

Celery is now to go into trench for the last time, and at an early date of the month, otherwise its time for growth will be limited. A rich, but rather strong soil, is always best for it. The plants of previous trenchings should be earthed-up gradually, so as to increase the length of the blanched stems without suffering any earth to fall into the hearts of the plants. In a dry soil and season, it is fortunate if an abundant supply of soft river-water be at hand.

Artichoke plants.—Displace some of the small, superfluous heads, and, as the larger are taken for table use, cut or break-out their stems.

Radishes.—Sow short top and scarlet kinds, also the red, white, and black Spanish varieties.

Onions.—Those fully bulbed, and the variety called the potato-onion, must be pressed aside, so as to expose them to the full sun, prior to their being taken up in dry weather.

Aromatic herbs.—Propagate by slips, especially such as have emitted root-processes near the ground. Preserve the flowers, and cut back their stems; shorten straggling shoots, keeping the plants of lavender, sage, hyssop, winter savory, rosemary, rue, and southernwood in due compass and order. Continue, as required, to sow mustard and cress.

Take up the middle-early *potatoes*, and if any tubers show a taint, reject them from the stores. (No disease is discernible at this date, 15th July, Swithin—the hottest day of the summer—with, however, a lively east wind.)

FRUIT DEPARTMENT.

Ripeness of the wood is a condition of the last consequence; and in wall-trellis and espalier-trees in can only be secured by regular and open training: let this be systematically attended to. If peach-trees have a manifest tendency to produce much rampant wood, with many straggling laterals, cutting-out proves but a fallacious remedy—a mere expedient. We can think of nothing more effectual than a judicious pruning of the roots (especially those which are rank and tap downward), about the end of January. Keep the laterals of *vines* to one joint, as before directed. Thin-out the bunches; remove ill-placed wood, but retain all the main leaves. Spur-prune the apple espaliers about the middle of the month. Examine all the trees, and wash away, with a brush, any American or mealy blight that may show itself. *Query*—as experiment—would not a weak solution of chloride of lime prove a very effective remedy?

Strawberry-runners, of all the sorts, should now be taken off, and in moist weather bedded where they are to remain. It appears to me that little advan-

tage is obtained from double removals; for, if one single good plant be taken from every known fertile stock, and it be set either in single-border row or in beds of three rows (being duly watered and firmly rooted), fine fruit must be the consequence. A deep loam, moderately manured at first, and mulched in the spring, before drought set-in, is most favourable. The *British Queen* is often most prolific—even in light, vegetable, loamy soil—as I have proved in three successive years. Remove the long dung and other litter between the rows, after the season is over, and clean the ground, displacing every weed.

Cut down the canes of *raspberries* that have borne fruit, to give light and air to the selected strongest succession rods.

Budding of cherries, apricots and plums, follow up by that of *apples, pears, peaches and nectarines*. The *Cuba bass* is the best ligature—it costs about 1s. 6d. per pound.

FLOWER GARDEN.

Increase double-flowered, herbaceous, and perennial plants, when the ground is in a moist and favourable condition, by taking up the entire plants, and carefully slipping and parting them, so as always to retain a portion of healthy roots; in this way, *double-rockets, rose-campions, daisies, hearts-ease*, and many other choice old favourites may be kept up and improved, by going into proper, new spots. I think the *Phyteuma orbiculare*, a native of our country, so rarely seen, may be recommended to notice. I have now by me one plant of it, in a compact close clump, which has on it 18 of its rich mazarine-blue heads of flowers of a large size, and on flower-stems above a foot high; it has bloomed with me for three successive years, I having raised a small root of it with a trowel, from a bank on the Sanderstead road, in the dry month of August, 1847.

Roses can still be budded, and to advantage, if the bark moves freely, and the weather be moist. A single slit is sufficient. Worsted ties, of 4—6 18-inch lengths, answer well, though the *Cuba-mat* is perhaps better. In general routine, the walks, the lawn, the flower-beds, and the shrubbery should be kept in the highest order. The scythe, broom, and roller should be in regular operation; the grass and all edgings kept neat; the walks, beds, and borders free from weeds, and every passing blossom and spent flower-stem immediately cut off and conveyed to the heap. Time is misspent by oversights, and additional trouble is caused by neglect.

CLOSING RETROSPECT.

The heat became oppressive on the 16th, and massive *cumuli* formed in the afternoon, threatening

a storm, but they dispersed about sun-set. A strong haze came on in the night, and remained till about 10 o'clock in the forenoon of the 17th, when it rose up, and the sun became very overpowering: temperature above 80 degrees, in the shade. About 2 o'clock, p. m., clouds suddenly formed, and from them there came a storm of thunder—quite dry in and about Croydon, but not so to the south of Reigate and Brighton, where hail or heavy rain fell. On the 18th, from 5 to 6 o'clock, p. m., we had very heavy thunder, followed by a soft and delicious rain, which came on again at several periods in the night and during the

19th. Nothing could be more genial or benign in its character. Nature was refreshed; the ground moistened several inches deep, without any violence being done, by wind or otherwise, to the fine crops of grain now changing colour.

The weather remained unsettled and rather showery to the 21st, evening, though the last day was sunny, warm (70 degrees), and fine on the whole. Growth of most vegetables became again rapid, and peas will furnish another fine crop. The potato-plant is verdant and strong; several early varieties are nearly ripe.

Croydon, 21st July.

J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JULY.

The heavy rains experienced in the early part of the month had the effect of "lodging" very large breadths of wheat in nearly the whole of our forward districts. As many parties anticipated a deficient yield from the damage said to be sustained in some localities by hail, and as very unfavourable reports came to hand from different parts of Ireland, especially from Kerry, respecting the appearance of the potato crop, the home-producers as well as the foreign importers of grain, notwithstanding the continued arrivals from the Baltic and elsewhere, were firm in their demands, and succeeded in enhancing the value of wheat nearly all over the kingdom from 1s. to 2s. per quarter—flour and some other articles being raised in the same proportion. However, the rains above referred to having been succeeded by warm sunshine and intervening light showers, the improvement in the quotations has not been supported, and the millers almost generally have purchased only for their immediate wants. Towards the close of the month, however, as much wet prevailed, prices were firm. It is of course impossible for us to state with anything like accuracy the amount of loss which the potato-growers in this country are likely to sustain during the present year from the disease; but for the most part our accounts are tolerably satisfactory on this head. That an unusually large extent of land has been planted with potatoes this season is evident, especially in Kent, Essex, &c.; while on the continent it exceeds all former years to a considerable extent. What progress the disease has made we are not in a position to state; but our impression is that no serious cases have yet been discovered, and which are likely to have any material effect upon the value of the better kinds of food. Nearly 10,000 tons of new potatoes have

already reached us, since the beginning of June, from France, Holland, and Belgium; and if our accounts are to be relied upon, taking it for granted that the acreable produce will be large, from 80,000 to 100,000 tons may be expected to arrive hither before the end of October, although prices are ruinously low: viz., from 60s. to 95s. per ton. The depression in our corn markets and the relatively high quotations in the United States and some of the Baltic ports have, as yet, had but little effect upon the extent of the importations of foreign corn: nevertheless our newly-fangled system, aided by the immense consumption going on, has prevented any increase in our warehoused stocks, which, for the most part, are composed of middling and inferior parcels, scarcely fit for mixing with better qualities.

Hitherto the turnip crop has gone on exceedingly well. Unquestionably the rains have been beneficial, especially upon light soils. The produce is expected to be unusually large, and possibly of good quality.

The markets for the sale of live stock and dead meat have continued in a very unsatisfactory state. Although a full average amount of business has been transacted in them, prices have ruled extremely low and unremunerative. From abroad the importations have continued large, though not equal to those of 1847. The heavy falls of rain having been productive of an immense quantity of grass in the whole of our grazing districts, depastured stock has fared extremely well, and but few inroads have been made upon the old stocks of hay, which are represented as large for the time of year. The losses by disease have been much smaller than for many years past.

Much discussion has sprung up amongst those immediately interested, as respects the supply of wheat at this time in the hands of the farmers. We have made the most careful inquiries on this

head, and find that in the midland districts they are rapidly diminishing. In the eastern, western, and southern counties they appear to be quite as large as usual at this period. The quantity of both beans and peas on hand is somewhat extensive; but that of barley and oats is very small: in fact, very few samples of either have been shown for some time past.

Harvest work is not expected to become general until the third week in August. A few new peas have been disposed of at Mark-Lane and in some of the country markets at 27s. to 30s. per quarter.

Our Scotch letters state that the crops of grain are looking very strong and healthy. Owing to the large influx of grain from abroad, the demand for all kinds of home-grown produce has ruled very inactive; but no material change has taken place in the quotations.

The result of the large extensive sales of colonial wool, showing, as it does, a large production of woollen goods in our manufacturing districts, has been regarded with more than usual interest. The quantity actually sold was 52,000 bales at full average prices. For British wools the demand has improved to some extent, and the quotations have had an upward tendency.

The produce of the crop grasses is turning out good; but the prevailing damp and unsettled weather has prevented extensive operations in the fields. Samples of new rapeseed have been disposed of in Mark-Lane, at £32 per last; being from £3 to £4 per last above the opening quotations of 1849. This advance must be attributed solely to the unusually small supplies of foreign at this time on hand.

Our accounts from all quarters relative to the general appearance of the hop bine are very favourable. Scarcely any blight has, as yet, made its appearance either in Kent or Sussex. The quantity of hops on hand in the metropolis is trifling; nevertheless, the transactions in them have been limited at drooping prices. In the month of July, 1849, the duty was estimated as low as £50,000: it is now called £180,000: but it has been done at £175,000, as accounts have reached us to the effect that the mould is increasing in some quarters.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Nearly the whole of the live stock markets, especially Smithfield, have been well supplied since we last wrote. Generally speaking, both beasts and sheep have been exhibited in full average condition, and notwithstanding that a large amount of business has been doing, prices have continued to rule extremely low. The fluctuations in the quotations have not exceeded 2d. per 8lbs. From abroad, the importations compared with those of 1847 and

1848 have fallen off; yet they must be considered large under the influence of a low range of value. The arrivals of beasts from the north of England have now fairly commenced; and it is stated, as most of the large farms are heavily stocked, that they will be considerably in excess of those of last season. From Scotland, the number of beasts has fallen off to some extent: but that from Ireland, direct by sea for the metropolis, has gone on increasing; yet it is evident that the shipments must have been attended with loss to the speculators. Our letters from the continent state that larger supplies of beasts, sheep, and calves, including pigs, are ready for our markets; but the low prices ruling here have deterred many of the Dutch graziers from forwarding, although freights are now much lower than they were last years.

The receipts from abroad into London, during the past month, have been as follow:—

Beasts.....	2,779 Head.
Sheep.....	9,445
Lambs	1,665
Calves.....	1,750
Pigs	450

Total	16,089
Same time in 1849.....	16,412
Same month in 1848.....	12,379

At Southampton, a few sheep and 10 beasts have arrived from Spain. At Hull and the various out-ports the importations have been 4,004 head.

The annexed statement shows the total supplies of stock exhibited in Smithfield:—

Beasts.....	16,741 Head.
Cows	451
Sheep and lambs	178,550
Calves.....	2,908
Pigs.....	2168

SUPPLIES AT CORRESPONDING PERIODS.

	July 1847.	July 1848.	July 1849.
Beasts.....	15,773 ..	16,878 ..	15,576
Cows	586 ..	495 ..	470
Sheep and lambs	153,290 ..	147,290 ..	162,900
Calves	3,693 ..	4,033 ..	2,615
Pigs	2,228 ..	2,350 ..	2,044

By sea, from Ireland, 125 beasts, 496 sheep, and 123 calves have come to hand; but their quality is scarcely suited for Smithfield.

The bullock supplies have been thus derived:—

Northern districts	3,200
Norfolk, &c.	6,520
Western and Midland Counties	2,000
Other parts of England	3,500
Scotland	950

COMPARISON OF PRICES.

	July, 1847.			July, 1848.			
	s.	d.		s.	d.		
Beef, from 3	8	to 5	0	2	8	to 4	2
Mutton.. 4	0	„ 5	4	3	8	„ 5	0
Lamb .. 5	2	„ 6	4	4	6	„ 5	6
Veal 4	4	„ 5	4	3	4	„ 4	4
Pork.... 4	0	„ 5	0	3	6	„ 4	6

July, 1849.

July, 1850.

	s.	d.	s.	d.		s.	d.	s.	d.	
Beef, from 2	8	to	4	0	2	4	to	3	8	
Mutton..	3	0	„	4	0	2	10	„	4	0
Lamb ..	4	0	„	5	0	3	8	„	4	10
Veal	3	0	„	3	10	2	6	„	3	6
Pork	3	2	„	4	0	3	2	„	4	0

Newgate and Leadenhall markets have been very scantily supplied with each kind of meat, in which a moderate business has been doing at full prices.

Beef has sold at from 2s. to 3s. 4d.; mutton, 2s. 2d. to 3s. 10d.; lamb, 3s. 6d. to 4s. 6d.; veal, 2s. 8d. to 3s. 6d.; and pork, 2s. 10d. to 3s. 10d. per 8lbs. by the carcase. From Sydney, 781 tins of preserved meat have come in.

ESSEX.

An early and somewhat severe winter—but not of very long continuance—was followed by a fine sowing season. March left with wheat in good plant, and barleys (although coming up slowly from the effects of cold) promising a crop from the beautiful state of the soil. Thus far our prospects for a crop were generally favourable; as the spring advanced, however, we experienced a reverse—rain falling in such quantities, that the barleys were thought to be fatally injured on the heavy soils. Here some wisecrack may be sounding his cuckoo note of “effectual draining.” We should not consider ourselves competent to stand in the first class in the old school, as practical farmers; but draining was carried on upon a farm with which we were connected some thirty ago, when some of our modern scientifics may have been in their swaddling clothes or tilting their go-carts; and as far as agriculture is concerned, they have scarcely got beyond the need of these things at present. The unfavourably wet weather in the spring was followed by considerable drought; we have not had much rain for the last two months until last week, when we were visited by heavy thunder-storms, in one case, at least, accompanied with hail and ice, doing damage, it is said, to the amount of several hundreds of pounds, by cutting off the crops or beating out the grain; the storms have been followed by a general rain. Hay is generally well secured, the crop not being large. Beans and peas not very good. Mangold-wurzel and turnips backward. Barley, except on the light soils, has turned out favourably. It is not unusual at this season of the year to have reports of blighted potatoes and deficient and blighted wheats; and although a close inspection of the crops may discover an occasional potato tuber not up to the mark, and ears of wheat not perfect, the potatoes are fine and of good flavour, and, for anything we have seen, sound (“Give a dog an ill name, and you may hang him”), and the wheats we report as a fair crop. Some of the heavy crops of wheat and barley are driven about by the late storms and rain, but we apprehend we are too near harvest for any very serious damage to result from merely being lodged, except with continued wet. Our markets are not brisk, with wheat 42s. per qr., while foreign barley is being offered at 21s., weighing 52lbs.; we have been informed it has been offered at a distance at 20s. 6d., weighing 54 lbs. Land agents, at the *rent audits*, and on other occasions, are attempting to buoy up the farmers with hopes of better prices, saying “the free trade crisis is past,” and we have even heard that £20 per load is the price to which we are steadily to advance. In the event of a fine harvest, of which we have been sanguine, prices will possibly decline even from their present amount; at all events, with steady imports of foreign grain, augmented stocks at home from last year, the unfavourable reports of the cotton crop, the state of the retail trades, and a probably good supply of grain

at market as soon as the new crop comes in, any great rise in prices can scarcely be expected; we should fear to hold wheat at present for any length of time, and for barley we suppose 20s. per qr. may be the price in the season, as, according to the Chancellor of the Exchequer, the consumption of malt is likely to decrease, and with considerable importations of foreign barley, the heavy malt duty, the price of beer and malt out of the reach of the masses, even at present prices, there is no telling to what points the price of barley may be reduced. Mr. Cayley's motion for repeal of the malt duty has been considered as signally defeated. As far as the votes of the crazy House of Commons go, such no doubt was the case; but as far as sound and irresistible arguments are concerned, it was signally triumphant; we venture to say, more effective speeches have seldom been delivered by private members of the House of Commons. The government felt their weight, Lord J. Russell sheltering himself behind a brewer—to wit, Sir C. Wood—catching hold of the skirts of Lord Stanley's garments for support; and for the old lady, the *Times*, it went mad—confounding malt with barley, and dealt a heavy blow on arithmetic; let them engage the services of a sober arithmetician, to prepare their figures without the aid of Mr. Wilson's ready reckoner. One leading free trade journal honourably yielded to the force of evidence, and admitted the malt tax, besides being a burden on the public, is an *agricultural* grievance.—July 25.

NOTTINGHAMSHIRE.

Since our last report the weather has been dry, and at intervals hot, but we have been occasionally favoured with a few thunder storms—mild in their nature, which has very much refreshed the vegetable world. Our pastures are generally short of grass, but the cattle has done well. There has not been too much humidity to affect the health of the animals by the exposure to wet, and the grasses have contained more nutritive matter in proportion to bulk than in wet seasons. The hay harvest is being brought to a close. The crop has fallen very light, but mostly gathered in excellent condition, so that we have it in quality if not in quantity; and perhaps the amount of consumable food may be equal to other years, for we well remember showery seasons when best quantities of hay were of very little value, and we felt a want with the bulk of damaged food about us. Our wheat crops are very good—quite an average—and mostly well up, so that there is every prospect of quantity and superior quality. The spring crops—as barley and oats—are very short, and must fall below an average. Beans are very short, and will be found deficient; peas partially so. Of the potato crop we hear of but few complaints; generally, we believe, they are good. The dryness of the season, no doubt, is most favourable for the root. A great breadth was planted, and the price will, we doubt not, be reduced to a moderate range. The turnip plant has, on the whole, stood well. On the limestone and more tenacious soils they are patchy, but still a fair quantity of plants remain, which, with proper attention, will make a fair crop. On the sandy soils the crop is good. The cultivation of the plant is being generally better understood, so that failures now are but few. Our markets for sheep and cattle continue in the same placid state as usual, and low in comparison to former prices. We shall take some seasoning to what must now be called remunerative prices. The corn markets have of late risen a few shillings per quarter, and fine white wheat has reached what we now call the enormous price of 53s. per quarter, but the quality excellent; red is worth from 45s. to 47s. per quarter. We shall now expect them to be as usual at this season of the year—regulated entirely by the weather. May a benign Providence preside over us! The demand for labour is good, and but little complaining among the working class.—July 22.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ANDOVER.—Weyhill lamb fair was held Friday last, and brought together a large number of dealers from all parts of the country. The number of lambs cooped was not quite so great as on the previous year, nevertheless good prices were obtained for the first quality, averaging 21s. 6d.; those of an inferior kind were soon bought up at prices varying from 18s. to 21s. A few fine ewes were sold at about 30s., and were readily sought for at about 1s. or 1s. 6d. per head better than Overton. In consequence of the abundance of sheep, the farmers held out for high prices, and many of the dealers were heard to complain that the price of sheep and other stock was above the proportionate rate obtained for other agricultural produce.

BICESTER MONTHLY MARKET.—The third of these business gatherings takes place on Friday next, the 2nd of August, and we have reason to expect that it will, like those that have preceded it, be well attended. The stock on sale is usually so good that the dealers have abundant supply to select from. This has led to the transaction of a large amount of business, and to an increased disposition on the part of the producers to support the undertaking, with the prosperity of which their interests are closely allied. The appointments for this year are August 2, September 6, October 4, November 1, and December 6. The ordinary business, hiring, and pleasure fairs will be held as usual. It is understood that on and after the 1st of October the town will have the advantage of railway communication by the further opening of the Buckinghamshire line. This will place it in an advantageous position, and make it generally accessible by the aid of the London and North Western and Great Western Railways.

BEWDLEY FAIR.—There were more sheep and lambs than were ever known before, numbering upwards of 3,000, which brought from 4½d. to 5d.; good lambs rather more; also a large supply of cattle; some very prime brought from 4½d. to 5d. per lb. A great number of horses of various sorts were exhibited, but very few were sold.

BRIGHTON FAIR.—The show was the best that has been exhibited since its establishment. There were from 18,000 to 20,000 sheep penned, and the attendance of buyers was numerous. There was a steady demand throughout the day; the price of lambs being from 1s. to 1s. 6d. on an average more than last year; they fetched from 10s. to 18s., with a good clearance. The show of horses and stock was superior, with improving prices, and the Welsh ruits were well cleared out.

BROMYARD FAIR was but scantily supplied with cattle, but plenty of buyers, at low rates; good cows with calves could be had at £8 to guineas, and yearlings from 65s. to 80s. each. Of sheep there was a tolerable supply; mutton may be quoted at about 4½d. to 5d.; lamb, 5½d.; long prices were asked for pigs, and but few changed hands. There were about thirty horses in the fair, but few of them were sold.

CAMELFORD FAIR.—The bullock fair was well supplied. Large oxen and steers sold pretty well, but cows and calves, which were plentiful, sold low; altogether about three hundred head of cattle were sold.

COLCHESTER FAIR.—The principal feature of the market was comprised in the horse show, in which, however, comparatively little trade was done. Among the best were a string of 32 good cart horses and Flemish and English colts, belonging to Mr. Martin, who got rid of the greater number of them at prices varying from £20 to £30, and one, a superior five-year-old cart mare, realized £42. Mr. Keyes also had a number of first-rate cart horses, and a few of a lighter breed; the former sold more readily (chiefly for London) at an average price of from £25 to £30, one fetching as much as £34. A few good nag horses were on the field, but, with scarcely an exception, they remained unsold. Useful cobs, a few of which changed hands, fetched from £14 to £20. There was an unusually large number of forest ponies, but in these not a great many deals were made. About 3,000 wether sheep and lambs were penned; but here again business was extremely slack, and a very small proportion of them changed hands; prices varied little from those given at our market. In the beast

trade sellers appeared to be aware of the state of the market, so that in this department there was but a meagre show, and the sales extremely limited.

HELSTON FAIR was well supplied with both fat and lean cattle. The demand for fat beasts was rather flat, and those sold realized from 40s. to 44s. per cwt. Lean beasts were not much in demand, and but very few bargains were effected. There were several fine French horses in the fair, some of which were purchased at pretty good prices.

NEWARK FORTNIGHT FAT-STOCK MARKET.—There was a good attendance of both buyers and sellers. A good amount of business was done, at about the prices of the previous market. There were 652 sheep and 62 beasts penned.

SHERBORNE FAIR (Thursday last) was not very well attended, owing to the great meeting of the Royal Agricultural Society being held at Exeter the same day. The number of sheep penned was far below the usual average, for they scarcely amounted to 2,000, but the sale was tolerably good, and the recent advance in prices was fully sustained. A pen of 100 very superior Down wethers, belonging to Mr. John Woolmington, of Haydon, were very generally admired for their beauty and symmetry, and were soon purchased at very nearly 40s. a head. The cow stock was also short, but quite sufficient for the demand, as the trade was dull, and only those of good quality found buyers. Fat beasts sold at from 8s. 6d. to 9s. per score; mutton 5½d. to 6d. per lb. The supply of pigs was good, and a fair number of them changed hands. There was a large number of horses offered, but being mostly of an inferior description, but few transactions took place.

ST. BOSWELL'S FAIR (Thursday).—The supply of both bred, three-parts, and half-bred lambs was smaller in point of numbers than last year, and the quality was considered, in the opinion of the most competent judges, to be generally inferior. Business continued to be very languid during the early part of the day, but about eleven o'clock a brisk trade was experienced, and in the course of two hours nearly the whole were disposed of. The top lots of bred lambs brought from 15s. to 18s.; second quality from 12s. 6d. to 14s. The top lots of three-parts bred lambs brought nearly the same prices. Faldonside and Spittal ewes and wedders brought 15s. 6d. Second qualities were selling from 12s. to 14s. Best lots of half-bred lambs brought from 13s. to 16s.; and those of inferior qualities were sold as low as 10s. The show of sheep was scarcely so great as last year; and, with the exception of a few lots, the quality was decidedly inferior. Half-bred hogs ranged from 22s. to 26s. Cheviot hogs sold from 18s. to 20s. Upon the whole, sellers have no reason to be dissatisfied with the result of the market; for although the prices were from 9d. to 1s. on the top lots of bred and three-parts bred lambs, under those of last year, yet, taking quality into consideration, last year's prices have been fully realized. Prices of grazing beasts ranged for three-year-olds from £9 to £11; two-year-olds from £6 to £7 10s.; and year-olds from 45s. to £5.

THORVERTON FAIR (Monday last) was tolerably well supplied as regards fat bullocks, some of which were sold at 8s. per score, but the general rate asked was at from 8s. to 8s. 6d. Steers and oxen were in good supply, indeed a larger number was driven in than has been the case for some time past, but business was very slack, and scarcely a sale was effected. The cows and calves were of an indifferent description, and as there was hardly any business doing, no particular price can be mentioned for quotation. The show of sheep was not so large as hitherto; many sales were effected, and business generally was good. Young wether sheep fetched at from 5d. to 5½d. per lb. Large ewe mutton was a complete drag, owing to the warm weather, and not more than 4½d. per lb. could be got. Lambs were in good supply, and business tolerably brisk; breeding lambs were at from 15s. to 24s. each; butchers' lambs from 5½d. to 6d. per lb. There was a large quantity of rams for sale and letting from the farms of Messrs. Francis, Bodley, Palmer, Carpenter, Jones, &c. Many were let, and those sold fetched higher prices than had been anticipated.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JULY.

At this period of the year, the attention of those engaged in the cultivation of the soil, and indeed that of nearly the entire community, is directed to the probable result of the harvest; and every change of weather is regarded with the utmost interest. Since we had last the pleasure of addressing our readers, the fluctuations in temperature, the transitions from intense heat to comparatively cold weather, and the occurrence of violent thunderstorms, have had the effect of causing considerable uneasiness to be felt as to the effects such atmospheric vicissitudes may have produced on the growing grain crops. The weather has certainly not been auspicious of late; and we must at once admit that we take a less sanguine view of the future prospects than we were induced to do at the close of June. The month commenced favourably; but between the 3rd and 10th inst. we experienced violent gales of wind, accompanied at times with heavy showers: these were succeeded by a week of great heat and frequent thunderstorms. From the 17th to the 20th the temperature was low, and a good deal of rain fell in different parts of the country, subsequently the barometer and thermometer rose, but the weather has, up to the period at which we write, been decidedly unsettled. We must now endeavour to trace the probable effects of such weather, as above described, on the crops.

Wheat did not come into bloom this year till towards the close of June, even in the southern parts of the kingdom, and a large proportion of the crop was still in full blossom when the high winds commenced, and it is to be feared that the shaking and rubbing thereby occasioned may in some instances have prevented the proper setting of the bloom; and in all such cases there will be a deficiency in the number of corns or berries in the ear. Another cause of apprehension is the extensive manner in which the crops have been beaten down by the wind and rain all along the south coast and in most of the southern and western counties. This last circumstance might perhaps not be followed by much mischief if the weather should, from now to harvest, be decidedly hot and dry; but if the crops should be exposed to more rain in their recumbent position the result might be disastrous.

Having adverted to the chances against a good harvest, we shall now look on the other side of the question; and we trust to satisfy our readers, that our prospects, after all, are not very dis-

couraging. Wheat is perhaps the only crop to which the rain which has fallen in July has done any material mischief. Barley has no doubt been badly lodged in districts where it was forward and heavy in the head; but to balance that, the later-sown has been benefited by the wet. The general crop of oats has also received great advantage from the copious supply of moisture; and beans, peas, and all root crops would inevitably have been very deficient, had the drought which had prevailed in June continued. At this period opinions must be in a great measure speculative, it being impossible to ascertain the exact position of affairs in all parts of the kingdom. We may, however, remark, that according to the best information we have been enabled to collect, the north and east have suffered much less than the south and west; and though wheat may prove rather deficient in the latter districts, there is reason to hope that the deficiency, if any, will be made good by the superior yield of other quarters. Looking carefully back at all that has occurred, and at the present position of affairs, we feel inclined to think that if favoured with auspicious weather from the beginning to the close of August, we should have no cause to complain of the general result of the harvest; but a large quantity of the growing corn is so situated as to be peculiarly liable to receive great injury from wet; hence, much rain would be almost certain to damage the quality and lessen the quantity. With the exception of some rye and a few patches of autumn-sown oats, and here and there an early piece of peas, no corn has yet been cut; and very little wheat will be fit for reaping before the middle of next month. The backwardness of the season is certainly against a favourable termination of the harvest, inasmuch as it will take a longer period to carry the corn. The days are already shortening, and in proportion as the nights become longer, the work of carrying must be protracted, owing firstly to the actual diminution of daylight and solar heat, and further from the heavy dews which generally prevail in autumn. Notwithstanding this drawback, we see no positive reason for apprehension; but quite sufficient uncertainty to render the next month or two an anxious period to the farmers and the dealers in corn. Before closing this part of our subject we must advert to the prospects for the potato crop. There were rumours of symptoms of the disorder having

manifested themselves as early as June; and these rumours have, within the last week, been revived: still as yet the accounts are of so vague a character as to leave room for hope that the disorder may prove less general than in previous seasons. The breadth of land devoted to the culture of potatoes in Ireland is, perhaps, as great this year as in any period previous to the first appearance of the disorder, in 1846. It follows, therefore, that even if a portion should be lost there may still be a larger quantity of sound potatoes than was grown last year; and as the quality of those hitherto brought forward has been satisfactorily spoken of, we trust that this favourite article of food will be more abundant in the sister isle than it has been since 1845. The future range of prices will be so entirely regulated by the weather, that it would be vain to pretend to predict. Many have lately become somewhat sanguine in this respect; but we must acknowledge that we see little prospect of our farmers obtaining much better prices for their produce so long as unrestricted foreign imports are admitted. A decidedly bad harvest in Great Britain would, of course, influence quotations all over the world, and for a time raise the value of agricultural produce here: but of this state of things the foreigner would reap the chief benefit, as we regard it as certain that higher rates would draw increased supplies from abroad, and that the latter would prevent the former reaching such an altitude as to remunerate the English farmer for the decrease in the quantity of his produce. There is evidently just now a disposition on the part of holders (farmers as well as merchants) to speculate on higher prices; and it is pretty clear that bad or even doubtful weather would occasion a not inconsiderable rise in quotations; but as yet there are no symptoms of the supplies from abroad falling off; and in the face of continued large arrivals of foreign grain it will need sustained excitement to cause a permanent improvement. A small deficiency in the yield of wheat in this country would not, we think, have that effect; and we certainly have no wish to see higher prices, if such are to be the consequences of a decidedly bad harvest, or of the recurrence of such misery as was occasioned in 1846 and 1847 by the potato failure in Ireland.

Hay-making was protracted to a later period than usual this year; but though the work was in many districts interrupted from time to time by showers, the crop was ultimately carried in tolerably good order. The bulk is decidedly less than last season, but the deficiency is not so great as was at one time feared would have proved the case. The price of the article has lately advanced about 10s. per load in the London markets.

We shall now proceed to give a review of the occurrences at Mark-lane during the month, which will, we think, afford a sufficient guide for forming a judgment of the general character of the trade in other parts of the kingdom, as the metropolis has, as usual, in a great measure influenced business at the leading provincial markets. The deliveries of wheat from the farmers have been small in all parts of the kingdom, and arrivals coastwise into the port of London have been very scanty, so that the consumption has been thrown principally on foreign.

The supply of English wheat, if we except that received per rail, (of which accurate returns are not published by all the companies,) have fallen short of 2,000 qrs. per week; being less than one-tenth of the quantity required for the consumption of the metropolis; but this has not, in reality, been much felt, the millers having always had a plentiful choice of foreign to select from. The trifling nature of the supply has, however, had the effect of rendering sellers firm.

Very little change occurred in prices until the 8th inst., when the unsettled state of the weather began to influence the minds of buyers, and an advance of 2s. per quarter was established on red as well as on white wheat. The subsequent week proving more favourable for the crops, a portion of the improvement was again lost on the 15th inst.; but factors were generally very reluctant to make any concession, and many held for the chance of a rally, in which they were not disappointed, the rates obtained on the 22nd being very nearly the same as those current on that day fortnight: say for good to fine Essex and Kent red 42s. to 44s., and for white 45s. to 48s.; selected samples 1s. to 2s. per qr. higher. Since then the tendency has again been rather upwards, but so very little English wheat has been brought forward that we do not feel warranted in making any alteration from the quotations just named.

From abroad we have received regular supplies, and during the first three weeks of the month the arrivals exceeded 50,000 quarters, principally from the north of Europe and from France. A larger proportion of the Baltic supply has this season come to hand in worse condition than is usually the case, though the vessels have not generally been long on the voyage; and as we have no grounds for supposing that there has been any want of care on the part of the shippers in selecting the cargoes, we can only attribute this circumstance to some peculiarity in the growth of last year. The effect has been to render really fine qualities relatively dearer than the commoner descriptions, and to occasion the latter to be difficult of disposal, whilst the former have throughout the month been in fair request.

Superior Danzig, the best Rostock, and the finer sorts of Dutch, French, and Belgian wheat rose in the same proportion as English on the 8th of July, and though offered somewhat lower on the following Monday, the partial decline then submitted to was afterwards recovered; quotations being now 1s. to 2s. per qr. higher than they were at the close of last month.

The present value of Polish Odessa is 37s. to 39s.; superior, 40s.; North of Europe red wheat, from 40s. to 44s.; fine Rostock, 45s. to 46s.; and Danzig from 44s. up to 50s. per quarter, according to quality. French red wheat varies in value from 38s. to 42s. per quarter.

The consumption of foreign wheat has, we are inclined to think, nearly kept pace with the supply, and we do not believe that the quantity in granary here is larger than it was at the end of June. To get at the exact stock in warehouse is not easy, since no official returns are kept, now that all cargoes have to pay duty from on board ship.

The town millers rose the nominal top price of flour to 40s. per sack on Monday, the 8th inst., and it has since remained steady at that figure. The supplies of country flour having been very small, and those from France only moderate, the article has throughout the month been held very firmly. The highest price obtained for Norfolk household flour has, we believe, been 31s. per sack in the river, which is relatively higher than the rates at which London manufactured households have been offered. Within the last few days the demand has rather improved. Fresh French flour has met a ready sale, and nearly all that has been received has been placed at full terms, say 31s. to 32s. for good, and 34s. to 35s. per sack for Paris whites. At present we have little on the wharves except stale and out-of-conditioned parcels.

English barley has come very sparingly forward; indeed, the stocks of this grain appear to be exhausted in all parts of the kingdom. The total arrival into London has amounted to only two or three hundred quarters during the month. There has consequently been little doing in the article, and in the absence of business of the slightest importance quotations have remained nominally unaltered for distilling and grinding qualities. With foreign barley the market has been well supplied, but importers have manifested no particular anxiety to realize; and not only have previous prices been well maintained, but for good, heavy, fresh lots enhanced terms have lately been demanded, under the impression that the receipts from abroad will fall off, and that all here is likely to be wanted before our own crop can possibly be made available.

The transactions in malt have been circumscribed throughout the month; there has, however, been

no pressure on the market, the supplies coastwise having been moderate. The small brewers are not by any means overstocked, and sellers being well aware of that fact, have held good qualities firmly at previous prices.

The arrivals of oats from our own coast and Scotland have been scanty in the extreme, and, having been altogether without receipts from Ireland, we have depended chiefly on foreign countries for supplies. The latter have, however, been of a sufficiently liberal character to prevent anything like scarcity being felt, and the tendency of prices has been rather downwards. During the first three weeks in July, upwards of 80,000 quarters of foreign oats arrived, and the dealers having throughout acted with extreme caution, the supply has proved more than adequate to the demand.

Really fine fresh corn has not receded in value since our last, but other descriptions have certainly given way more or less during the last eight or ten days. Up to the 8th instant prices remained nearly stationary; the upward movement which then took place in wheat had some influence on other articles, and oats participated in the improvement to the extent of 6d. per qr. This small rise was, however, lost on the following Monday; and on the 22nd instant the article was obtainable on easier terms than in the beginning of the month. We have lately received several thousand quarters from Riga and Archangel. The quantity of the Russian oats is good this year, and most of the cargoes from thence have come to hand in fair condition, which has caused this description of corn to meet a ready sale at 16s. to 16s. 6d. per qr., for good feed. The Danish, Swedish, and Dutch oats have, in the majority of cases, come to hand in a heated state, which has rendered it necessary to land, and endeavour to restore the condition by turning and working in granary, or sacrifice, at very low rates, from on board ship. English and Scotch oats having become very scarce, have commanded relatively higher prices than foreign. Lincolnshire feed have realized 16s. to 17s., and Polands 17s. to 19s. per qr., whilst good Scotch feed have not sold under 20s., and for superior lots 1s. to 2s. per qr. more has been demanded.

Very little variation has taken place in the value of English beans; the quantity brought forward has not been large, and the demand has been of a retail character; in which position of affairs quotations have undergone no change requiring to be noticed. Within the last week we have heard numerous complaints of the black dolphin having attacked the crop, but this has hitherto failed to create any disposition to speculate. The arrivals of Egyptian beans have been only moderate, and

there have not been many offers of floating cargoes; 18s. 6d. to 19s. per qr., cost and freight, has been demanded, and parcels in granary have been held at 20s. to 21s. per qr.

The demand for peas has, throughout the month, been slow, and very little change has occurred in prices; good white boilers, as well as the best maple peas, of home growth, having realized 25s. to 27s. per qr., in small quantities. One sample of *new* white peas appeared on the 22nd July, from Essex; the quality was tolerably good, but having been harvested too early, the condition was rather soft; for this small lot 27s. per qr. was paid.

The demand for floating cargoes of Indian-corn diminished in proportion as supplies of new potatoes increased, and offers were till within the last week made at rates which would certainly not have been taken by sellers at the close of June, say 26s. to 27s. 6d. per qr., cost and freight. The less favourable accounts from Ireland, received since the 22nd ult., relative to the position of the potato crop (it having been positively asserted that unequivocal symptoms of blight had manifested themselves in different parts of the island) have produced some effect, and higher rates have again been asked for floating cargoes of Indian-corn.

The periods of depression which have taken place at different times in the wheat trade in this country during the summer have failed to have any influence on the minds of holders of that article abroad, but the slightest indication of a rise here has been immediately responded to in all the foreign markets. Quotations have, consequently, been kept relatively higher on the continent than in the English markets, and most of the imports into Great Britain have lost money. Still, when there is the slightest appearance of a rise here, parties may always be found ready to run the risk of sending out orders; and, notwithstanding the want of profit which has attended this branch of business, we have, till now, had good arrivals from abroad. Stocks of old grain are reported to have been reduced into a narrow compass, as well in the north of Europe as in France; and, from all we have been enabled to collect, it seems that in America the quantity on hand (particularly at the Atlantic ports) is very trifling. That this may be the case as regards the stocks held by merchants we do not question, but we are inclined to think that farmers are not so badly provided, either in Europe or America, as the last crop was not complained of, and the deliveries from the foreign growers have at no period since the harvest of 1849 been liberal.

With reference to the growing crops the accounts are, as usual, rather contradictory. Earlier in the season the rye crop was badly spoken of, extensive

damage having, it was said, been done by the severity of the weather in the spring. It has since been allowed that the mischief has turned out somewhat less than expected, and that the deficiency will not prove so serious as was at one time apprehended. In Volhynia the grain crops, wheat as well as spring corn, are said to have suffered from drought; but taking the whole of the continent together, north and south, east and west, we have had fewer complaints than usual at this period of the year, and our impression is that the quality will be good, and the yield large.

In the south of France, in Italy, Tuscany, &c., harvest has been some time commenced, and the reports from thence are of a decidedly favourable character.

From the United States and Canada the advices do not give a very promising account of the probable result of the Wheat harvest, and the breadth of land under cultivation is said to be less than in ordinary seasons, owing to the emigration of many farmers to California. Making due allowance for that circumstance, and for the vent which exportation to California will afford for the produce of the States, we are inclined to think that we shall not receive any supplies of bread stuffs of importance from the other side of the Atlantic either this year or in 1851. On the other hand, we feel satisfied that the continent of Europe will afford an enormous surplus for shipment to England.

At all the Baltic ports prices have risen since we last addressed our readers; but excepting at Danzig, not much business has been done. The latest advices from the last named port state that fine high mixed qualities had advanced to 44s. and 45s., and other sorts had realized from 40s. to 43s. per qr. free on board, according to quality. During the week ending 13th July, some large purchases were made for shipment to Great Britain; but on the 20th ult. the demand had slackened.

At the lower ports a good deal of speculation took place about the middle of the month, owing to the more encouraging character of the English accounts, and to the fact of a few unsettled days having been experienced. At Rostock prices were driven up to 44s. and 45s., and at Anclam, Stralsund, Greifswald, &c., holders have lately refused to sell the best qualities below 40s. to 42s. per qr. free on board.

At the near continental ports some re-action has lately taken place in consequence of the more subdued advices from hence; still, as compared with quotations at the end of June, the advance is considerable in the Baltic, and at Hamburg, as well as in most of the French, Dutch, and Belgian markets.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.		1849.	
	OLD	NEW	1848	1849
WHEAT, Essex and Kent, white	42 to 50	42 to 50	42	50
Ditto, fine selected runs	—	—	49	51
Ditto, red	40	42	43	44
Ditto, extra	42	43	44	45
Norfolk, Lincolnshire and Yorkshire ..	—	—	41	44
Ditto, white	—	—	43	46
BARLEY, English, malting and distilling ..	—	—	23	25
Ditto, Chevalier	—	—	26	27
Ditto, grinding	—	—	19	21
MALT .. Essex, Norfolk and Suffolk	43	45	44	48
Kingston, Ware, and town made	45	52	48	54
OATS, Essex and Suffolk	—	—	16	17
Lincolnshire and Yorkshire (Polands) ..	—	—	18	19
Ditto, feed	—	—	16	17
Devon & West Country, feed	—	—	14	16
Northumberland and Scotch, feed ..	—	—	18	22
Dundalk, Newry, and Belfast, potato ..	—	—	16	18
Limerick, Sligo, and Westport, potato ..	—	—	16	19
Ditto, feed	—	—	15	17
Cork, Waterford, Dublin, Youghal, and	—	—	—	—
Clonmel, black	—	—	14	15
Ditto, white	—	—	14	16
Galway	—	—	12	14
BEANS, Masagan	—	—	24	26
Tick	—	—	25	28
Harrow	—	—	28	30
Pigeon, Heliogland	—	—	28	30
Windsor	—	—	25	27
Long pod	—	—	25	28
PEAS, non-boilers	—	—	23	24
White, Essex, and Kent, boilers	—	—	25	27
Ditto, fine Suffolk	—	—	26	28
Maple	—	—	24	26
Hog and grey	—	—	25	26
FLOUR, best marks (per sack of 280 lbs.) ..	—	—	35	49
Norfolk and Suffolk, ex-ship	—	—	29	33
RYE	—	—	21	23

FOREIGN GRAIN.

	Shillings per Quarter.	
	42	46
WHEAT, American, white	none	—
Canada	—	—
Dantzic and Konigsberg	44	48
Dantzic, fine white, extra quality	43	50
Stettin and Hamburg	40	43
Danish	39	42
Rostock, Pomeranian and Rhine	42	46
French and Belgian	40	44
Mediterranean, Odessa, and St. Petersburg ..	35	39
Black Sea (nominal) hard to soft	35	38
Buck or Brank	23	26
BARLEY, malting	21	23
Grinding and distilling	19	20
Hamburg, Dantzic, Konigsburgh, and Riga ..	18	19
Danish, Mecklenberg, and Pomeranian	18	20
OATS, Dutch, brew. Poland, Friesland, and Groningen	18	20
Danish and Swedish	15	18
Russian	16	17
BEANS Small	25	28
Egyptian	19	21
PEAS, white boilers	21	24
Yellow ditto	24	27
Non-boilers	22	24
MAIZE, white	27	29
FLOUR, American, sweet	23	25
Ditto, sour	21	23
Canadian, sweet	22	24

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING JULY 20, 1850.

PRICE.	June 15.	June 22.	June 29.	July 6.	July 13.	July 20.
42s. 4d.	..	..	..	..	..	..
41s. 8d.	..	..	..	..	..	..
41s. 11d.	..	..	..	..	..	..
40s. 9d.	..	..	..	..	..	..
40s. 6d.	..	..	..	..	..	..
39s. 11d.	..	..	..	..	..	..

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
June 15, 1850 ..	39	11	21	9	16	11	22	8	26	10	27	3
June 22, 1850 ..	40	5	22	8	16	10	22	6	26	7	26	9
June 29, 1850 ..	40	9	21	6	16	5	21	6	26	11	26	11
July 6, 1850 ..	40	11	21	9	17	0	23	2	26	10	28	4
July 13, 1850 ..	41	3	21	5	16	11	23	3	27	2	26	6
July 20, 1850 ..	42	4	22	3	17	9	22	7	27	5	27	11
Aggregate average	—	—	—	—	—	—	—	—	—	—	—	—
of last six weeks	40	11	21	11	17	0	22	7	27	0	27	3
Comparative ave.	—	—	—	—	—	—	—	—	—	—	—	—
same time last year	46	4	26	0	18	5	27	2	31	6	31	8
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's			Averages from the correspond-		
Gazette.			ing Gazette in 1849. Av.		
	Qrs.	s. d.		Qrs.	s. d.
Wheat ..	81,901 ..	42 4	Wheat ..	75,705 ..	48 10
Barley ..	2,343 ..	22 3	Barley ..	1,388 ..	26 7
Oats	15,785 ..	17 9	Oats	9,915 ..	19 4
Rye	100 ..	22 7	Rye	51 ..	28 6
Beans	2,861 ..	27 5	Beans	1,259 ..	32 1
Peas	362 ..	27 11	Peas	165 ..	32 4

PRICES OF SEEDS.

MONDAY, JULY 29.

There was an increased show of new Rapeseed, and a further reduction occurred; good dry parcels being offered at 28s. per last. Some samples of fine new Carraway appeared, which realized from 30s. to 32s. per cwt. Canary Seed was plentiful, and 2s. to 3s. per qr. cheaper. In other articles no change occurred.

BRITISH SEEDS.

Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3 lbs. each) .. £8 0s. to £9 0s.
 Coa Grass (nominal) .. —s. to —s.
 Trefoil (per cwt.) .. —s. to —s.
 Rapeseed, (per last) new £27 to £29 .. old £— to £—
 Ditto Cake (per ton) .. £4 15s. to £5 10s.
 Mustard (per bushel) white .. 6s. to 8s.; brown, 9s. to 13s.
 Coriander (per cwt.) .. 16s. to 24s.
 Canary (per qr.) new .. 65s. to 70s.
 Tares, Winter, per bush., nominal; Spring, 3s. 0d. to 4s. 0d.
 Carraway (per cwt.) .. new, 30s. to 32s.; fine 33s.
 Turnip, white (per bush.) .. —s. to —s.; do. Swedish, —s. to —s.
 Cloverseed, nominal.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. .. 24s. to 42s.
 Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton) .. £6 0s. to £7 10s.
 Rape Cake (per ton) .. £4 4s. to £5 0s.
 Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 34s. to 36s.
 Tares, (per qr.) .. small 21s. to 24s., large 25s. to 30s.
 Rye Grass (per qr.) .. —s. to —s.
 Coriander (per cwt) .. —s. to —s.

BOROUGH HOP MARKET.

MONDAY, July 29.

Rather more inquiry may be noticed in our market for the better descriptions of Hops of last year's growth, but at no improvement upon last week's rates. The duty is estimated at £185,000.

HORTON AND HART.

WORCESTER, (Saturday last.)—Our hops are progressing favourably, and with as fine weather next month as we have had this are likely to produce more than an average crop. There continues to be a fair retail demand for fine old Hops at rather less money.

ENGLISH BUTTER MARKET.

MONDAY, JULY 29.

We have no alteration to note in our trade, and prices keep pretty steady.

Dorset, fine weekly..... 74s. to 78s. per cwt.

Middling and stale ditto.... 60s. to 68s.

Devon 64s. to 68s.

Fresh, 9s. to 10s. 6d. per doz. lbs.

BELFAST, (Friday last).—Butter: Shipping price, 63s. to 67s. per cwt.; firkins and crocks, 6d. to 6½d. per lb.; Bacon, 37s. to 40s.; Hams, prime, 65s. to 70s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 60s. to 62s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 42s. to 46s.; kegs or firkins, 40s. to 41s. per cwt.

July	Butter,			Bacon,			Dried Hams,			Mess Pork		
25.	s.	d.	s.	s.	d.	s.	s.	d.	s.	s.	d.	s.
1846	84	0	85	0	47	0	52	0	56	0	62	0
1847	88	0	90	0	64	0	72	0	75	0	82	0
1848	7	0	80	0	58	0	62	0	66	0	72	0
1849	60	0	65	0	48	0	50	0	58	0	60	0
1850	62	0	67	0	37	0	42	0	45	0	70	0

COVENT GARDEN MARKET.

THURSDAY, July 25.

ENGLISH FRUITS.

	s.	d.	s.	d.
Strawberries, per pottle	0	2	to	0 4
Pine-apples, per lb. .. .	3	6		5 0
Hothouse Grapes, do. .. .	1	6		3 0
Peaches, per doz. .. .	10	0		15 0
Nectarines, do. .. .	10	0		15 0
Melons, each .. .	3	0		5 0
Figs, per doz. .. .	2	0		4 0
Green Gooseberries, per bushel .. .	3	0		4 0
Currants, red, per half sieve .. .	2	6		3 0
" white, do. .. .	3	0		5 0
" black, do. .. .	4	0		5 0
Raspberries, per pottle .. .	0	2		0 4
Cherries, per half sieve .. .	3	0		5 0
Fine British Green Strawberries, per doz. pun. .. .	5	0		8 0
Muscats of Alexandria Grapes, per lb. .. .	4	0		6 0
Plums, per half sieve .. .	2	0		3 0

FOREIGN FRUITS.

West Indian Pine Apples .. .	1	0		4 0
Apricots, ripe, per dozen .. .	4	0		6 0
Cherries, per lb. .. .	0	1½		0 2
Lemons, per 100 .. .	5	0		10 0
Almonds, per peck. .. .	5	0		6 0
Spanish Nuts, per peck. .. .	4	0		5 0
Spanish Chesnuts, per peck .. .	3	0		6 0
Brazil Nuts, &c. .. .	3	0		4 0
Barcelona Nuts, do. .. .	5	0		6 0

VEGETABLES.

Cucumbers, per brace .. .	0	4		1 2
Cauliflowers, per dozen .. .	1	3		2 6
Horseradish, per bundle .. .	2	0		5 0
Parley, per dozen bundles .. .	0	4		0 6
Early York Cabbages, per dozen .. .	0	4		0 8
Red Beet, per dozen .. .	1	6		2 0
Mushrooms, per pottle .. .	1	9		2 6
Small Salad, per dozen punnets .. .	1	0		1 3
Sage, per dozen bunches .. .	1	0		1 3
Globe Artichokes, per dozen .. .	2	0		2 6
French Beans, per half sieve .. .	8	0		10 0
Cabbage Lettuces, per score .. .	0	3		0 4
White Cos Lettuces, do. .. .	0	9		1 0
Watercress, per dozen bunches .. .	0	0		0 6
Mint, per dozen bunches .. .	0	9		1 0
Peas, per bush. .. .	1	3		2 6
Ditto, shelled, per quart .. .	0	6		0 9
Turnips, per dozen bunches .. .	4	0		6 0
Carrots, do. .. .	3	0		4 0
Turnip Radishes, per dozen hands .. .	0	3		0 4
Early Frame Potatoes, per lb. .. .	0	2		0 2½
Cornwall New Potatoes, per dozen lbs. .. .	1	0		1 6
Broad Beans, per half sieve .. .	0	9		1 6

WOOL MARKETS.

LIVERPOOL, July 27.

SCOTCH.—The demand for all kinds of combing wools continues brisk, and prices very firm; but still our market hardly keeps pace with the prices reported to be paying in the country.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs.	8	3	to	9 3
White Highland do.	10	6		11 0
Laid Crossed do. unwashed .. .	9	6		10 6
Do. do. washed .. .	10	6		12 6
Laid Cheviot do. unwashed .. .	10	0		12 6
Do. do. washed .. .	16	6		18 6
White Cheviot do. do.	24	0		26 0

FOREIGN.—There is not much doing, there being but a limited supply in hand.

HIDE AND SKIN MARKETS.

	s.	d.	s.	d.
Market Hides, 56 to 64lbs.	0	1½	to	0 1½
Do. 64 72lbs.	0	1½		0 1½
Do. 72 80lbs.	0	2		0 2½
Do. 80 88lbs.	0	2½		0 3½
Do. 88 96lbs.	0	3		0 3½
Do. 96 104lbs.	0	3½		0 3½
Do. 104 112lbs.	0	4		0 0
Calf Skins, light .. .	2	9		3 6 each.
Ditto, full .. .	5	6		6 0
Horse Hides .. .	6	6		7 0
Lamb Skins .. .	1	6		2 5
Shearlings .. .	1	0		1 4

BARK.

Per load of 45 cwt.

English, Tree .. .	£13	0	0	to	£14	0	0
Coriaria .. .	14	0	6		16	0	0

FLAX.

BELFAST, (Friday last).—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

OILS.

Linseed, 33s 6d. per cwt.; Rapeseed, English; refined, 37s.; do. brown, 36s.; Gallipoli, per tun, 42l., Spanish, 41l.; Sperm, 85l.; do. bagged, 83l.; South Sea 34l.; Seal, pale, 31l.; Cod, 35l.; Cocoa Nut per ton, 38l. to 40l.; Palm, 32l.

PRICES OF MANURES.

LONDON, JULY 29.

GUANO.—Nothing doing.
SUPERPHOSPHATE OF LIME.—A good demand still exists for Rape and late Turnips.

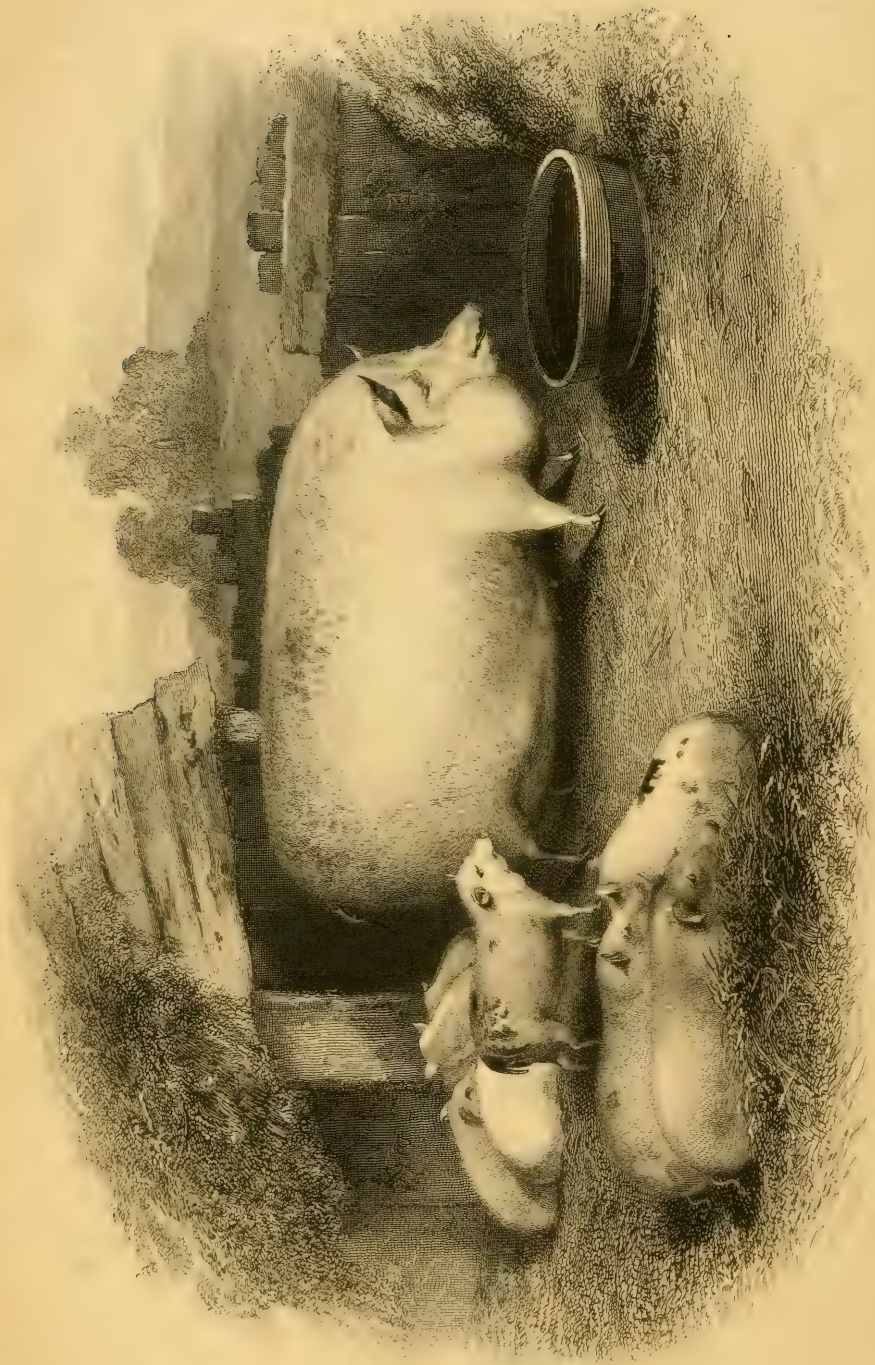
LINSEED CAKES still command higher rates.

NITRATE OF SODA.—Nothing doing for agricultural purposes.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

Guano, Peruvian .. .	per ton	£0	0	0	to	£9	5	0
" In quantities under 5 tons .. .		0	0	0	to	9	10	0
Potter's Guano .. .		0	0	0	to	7	0	0
Nitrate Soda .. .		14	0	0	to	14	5	0
Nitrate Potash or Saltpetre .. .		26	0	0	to	28	0	0
Superphosphate of Lime .. .		0	0	0	to	6	6	0
Soda, Ash or Alkali .. .		0	0	0	to	9	0	0
Gypsum .. .		1	10	0	to	1	15	0
Coprolite .. .		3	0	0	to	3	5	0
Sulphate of Copper, or Roman Vitriol for Wheat steeping .. .		27	0	0	to	29	0	0
Salt .. .		0	0	0	to	1	5	0
Bones, ½ inch .. .	per qr.	0	0	0	to	0	15	0
" Dust .. .		0	0	0	to	0	17	0
Oil Vitriol, concentrated .. .	per lb.	0	0	0	to	0	0	1
" Brown .. .		0	0	0	to	0	0	¾
Rape Cakes .. .	per ton	4	0	0	to	4	5	0
Linseed Cakes—								
Thin American in barrels or bags .. .		7	0	0	to	7	10	0
Thick ditto round .. .		6	5	0	to	6	10	0
Marseilles .. .		6	10	0	to	6	15	0
English .. .		6	10	0	to	6	15	0

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THE FARMER'S MAGAZINE.

SEPTEMBER, 1850.

No. 3.—VOL. XXII.]

[SECOND SERIES.

PLATE I.

A SOW OF THE LARGE BREED AND PIGS.

The subject of this plate, the property of Mr. Joseph Tuley, Exley Head, near Keighly, Yorkshire, obtained the first prize of six sovereigns at the Yorkshire Agricultural Society's Meeting at Scarborough, in 1847, and also the first prize of ten sovereigns at the Royal Agricultural Society's Meeting, at York, 1848.

PLATE II.

THE BRITISH YEOMAN.

WINNER OF THE GREAT METROPOLITAN STEEPLE-CHASE, 1849.

The British Yeoman, a bay horse, bred by Mr. V. Corbet in 1839, was got by Count Porro, out of Pintail by Pioneer, her dam Ringtail by Buzzard, her dam by Trentham out of Cytherea, sister to Drone by Herod—Lily by Blank.

Count Porro, bred by Mr. Lambton in 1822, was by Leopold, out of Wathcote Lass, by Remembrancer, her dam—Gratitude's dam—by Walnut—Ruler—Piracantha, by Matchem. The Count was but a bad race-horse, having during the three seasons he was in training never won anything but a fifty pound plate. As a stud-horse, too, he does not rank high; for beyond a couple of fairish mares, Jemima and Miss Maria, the property of Sir Richard Bulkeley, and his great card the Yeoman, there has been nothing out by him to "signify." His stock, however, were generally handsome, with—a family likeness—particularly good, blood-like heads. He is dead.

Pintail, bred by Mr. Rush in 1824, and the last of a dozen foals her dam produced, never ran but once, when she was not placed, in a two-year-old stake at Newmarket. She was sold the following spring, at the hammer, to Mr. Corbet, who bred from her some for seasons with but indifferent success. Our friend "the Racing Man," though, is so well up (as the lawyers say) in this case, that to make the history complete we repeat the following from his account of the Metropolitan Steeple Chase. After a note of admiration for Mr. Mason, he thus proceeds:—

"Of his horse, 'The British Yeoman,' I am perhaps better qualified to speak than of his accomplished jockey, this across-country crack having been bred by a much respected friend, and affording a striking example of the success that perseverance will sometimes attain to in breeding. Pintail, the dam of the Yeoman, was put to the stud at three years old; and throwing a foal almost every spring for thirteen or fourteen years, never up to that time produced one worth breaking. Many of them were fine good-looking colts; that in no way, however, fulfilled the promise of their appearance; as race-horses, and they were tried often enough, not one could win a ten pound note. As hunters they were famous for bad hocks, and not being able to go a yard through dirt. Many a day have I sickened on one, whose only fit duty, with his fine mouth and good action, was to canter up Rotten Row. So disheartening, in fact, did the case become, that the celebrated Nimrod, when on a visit at the house, walked into the drawing room one morning, after a round of inspection, with these words in his mouth:

"My dear madam, I can tell you how to save my old friend a good income."

"How, pray?" of course inquired the lady.

"By cutting that brute Pintail's throat."

"And yet, after that, this brute, Pintail, lived to produce the very best steeple-chase horse of his day."

"The British Yeoman is altogether a better horse than he looks. From his appearance you would hardly give him credit for carrying that weight through dirt he has so sufficiently proved he can do."

OLD SERIES.]

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He is light everywhere, all wire in fact, with far more the cut and carriage of a race-horse than a hunter. From what I could gather of him, I should say two of his best points were, a fine mild temper and excellent action for the kind of country I saw him go over. I have little doubt, indeed, that with some material to work on, much of his success is due to the clever hands into which he has fallen."

To this we have only to add, that Pintail died in foal in 1843, and that for "thirteen or fourteen" the "Stud Book" limits her produce to ten.

The British Yeoman's performances are also, like himself, "better than they look." His career has been anything but one of uninterrupted success; but he nearly always, it will be observed, has run well up to the finish; and many of his losing races, for gameness and extraordinary power with weight through dirt, have few equals in the Calendar. Of these we may especially instance his running second to Vain Hope, over the Vale of Aylesbury, and the third place he claimed after the great use made of him two years since in the Liverpool Grand National.

The Yeoman has this year been prepared with Mr. Hall's clever little pack of harriers, in preference to submitting him to a race-horse course the of study, which, we believe, the majority of steeple-chase horses also are now brought under. He is, as he has been from his first appearance in public, the property of Mr. Elmore, the well-known dealer, and may rank very justly with the Lottery and Gaylad of the same stable.

SUMMARY OF THE BRITISH YEOMAN'S PERFORMANCES.

In 1847 he started three times, and won once—a Chase at Newport Pagnell, value clear £75. In 1848 he started eleven times, and won three, and ran third five times—the Handicap Chase at Newmarket, £245; the Handicap Chase at Bath, £245; the Handicap Chase at Windsor, £355. In 1849 he started eight times, and won twice, running second twice and fourth twice—the Spring Handicap Chase at the Metropolitan £690; the Autumn Handicap Chase at the Metropolitan £295.—£1,905

His performances during the present year have been confined to three or four unsuccessful essays at heavy weights.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. V.

The profit or loss of a family dairy must depend altogether upon the means and appliances at command, and the judgment which is exercised in their application. I have endeavoured, in the preceding articles of this series, to place before the occupiers of small pieces of land the results of domestic experience and observation for a period of nearly thirty years in the Isle of Thanet, Somerset and Wilts borders, Berkshire, and East Surrey; and keeping in view the leading fact that *pasture-food* and *stall-feeding* constitute the basis of successful practice, I now proceed to notice the substitutes for pasture, alluded to in the last paragraph of Article 4, page 93. In the dry lands, reposing upon Chalk Cliff, in the Isle of Thanet, dependence must be placed upon those lime plants, called artificial grasses, though in fact they belong exclusively to the leguminous families, and hold no relationship with any of the true grasses. Of these *Lucerne* is the chief; and next to it is *Sainfoin*, termed in Wiltshire, and elsewhere, French-grass.

LUCERNE—*Medicago sativa*, i. e. garden cultivated Medic—is a very deep-rooting perennial, which therefore requires a mellow rich loam of at least 14 inches in depth, resting upon an open sub-soil that can admit the descent and branching of the main root and its ramifications, to the extent of three or four feet. Judging from the vigour it

maintains in Thanet for a long course of years, we should conclude that the plant delights in open chalk-rock. In Berkshire, where I raised it from seed, the loam rested upon open chalk, above gravel; and thus, having watched its progress in two counties, widely apart, I am able to enter upon the detail of my own experience. In the island I found the plant in that condition at which it always arrives when the land has been neglected during two or three successive seasons: it had become patchy, and surrounded by those grasses which are natives of the locality. The dispersed lucerne plants were pretty strong in the year 1820, and the grasses rich; in 1821 the lucerne declined, being constantly invaded by these grasses, and in the following year it was nearly overwhelmed. The paddock sufficed, however, to furnish moderate cuttings for the stall, and then for a nibble, the cow being chained and pinned, so as to enjoy a small, circular, fresh range every fine day, during six months of the year. I allude to these circumstances in order to impress the necessity of keeping the lucerne plant entirely clean, so long as it is intended for stall fodder.

In Berkshire, two plots were formed. The first and smaller, as an experiment, was prepared thus: The site was an orchard meadow, taken originally out of a farm-yard; the staple soil a rather gritty, hazel-loam, mixed with much chalk in parts, that

had been artificially brought in. The turf was pared off and turned, grass downward, into the bottom of every two-foot-wide trench, which was dug to the full depth of three long spits over the entire piece. The trenching completed, and the ground settled, turnips were sown in drills, and produced a prodigious herbage, with a comparatively poor crop of bulbs; the fresh soil being far too rich for the purpose. In the following year, early in April, the surface was cleaned and raked to remove all the larger stones, the lucerne seed was sown in drills about ten inches apart, and the depth of cabbage-seeds, covered, and the earth trod over, and then rolled with a stone garden-roller. I estimate this plot at two square rods or perches.

The second plot might measure a third of an acre, and was prepared much in the same manner as the first—it was a piece taken from a common, but of much finer loam, rather sandy in texture, and capable of being deeply wrought. In trenching, the inverted turves were liberally sprinkled with common salt, so that a full sack of four bushels was employed in the operation. Potatoes formed the first crop, and these were planted according to the scientific directions of Mr. Knight, with whom I was then in correspondence, namely, *entire tubers*, in deep drills (4 inches) ranging south and north, and from 3 to 4 or 5 feet asunder, according to the known heights of the stems—the *tubers* in no case farther than six inches apart in the rows. Nothing could exceed the beauty of this plantation after the first moulding-up, and before the stems began to lose their perpendicularity.

No disease existed then, or for thirteen years after! What would the great advocate of the potato have thought and *felt*, had he lived to witness the pest which has been permitted to scourge that favourite vegetable during six consecutive seasons?

In the following spring, (early April,) the lucerne seeds were sown in drills about nine inches apart, the covering fine earth, raked and rolled. The plants germinated equally and speedily; they were so favoured by a season genial in every respect, that we were enabled to mow the young plants in a very few weeks, and again to cut an ample supply of green food for any Alderney cow, four times between May and November of the same *first* year. I never permitted the lucerne to come into flower; but such was the rapidity of the growth, that before the entire piece was mown at any one of the summer cuttings, the side first begun was again ready for the scythe.

The plot was not manured to any extent at any subsequent period; but the spaces were hoed after the several cuttings, so as to prevent the advance

of weeds. At this point, and as respects the distances of the rows, it will be right to extract the following lines from Baxter's "Library of Agricultural Knowledge:"—

"Mr. Cunningham prefers sowing lucerne-seed in drills, from 14 to 15 inches apart. It is oftentimes drilled at 18 inches to 2 feet, the intervals being well horse-hoed; but these wide intervals are much objected to by Mr. Arthur Young. If kept clean-hoed, the lucerne picks up so much dirt, being beaten to the earth by rain, &c., that it is unwholesome, and the plants spread so much, that it must be reaped with a hook, which is a great and useless expense. For these reasons, and for the superiority of the crop, he recommends drilling at nine inches, which in point of produce, mowing, and freedom from dirt, is the same as broadcast; and another advantage is that it admits scarifying once a year, which is much more powerful than any harrowing. The quantity of seed when drilled is at the rate of from 15 to 20 lbs. per acre."

I found the small three-prong fork to be the best instrument for keeping the spaces clean during the cuttings, and advise it to be used daily: the spade, or broad hoe, is apt to damage the crowns, and thus to produce blanks. My lucerne yielded six (perhaps seven) cuttings-over in one subsequent year—four cuttings are the estimated usual averages; but persons in general wait too long, even till the plant shows its bloom: we preferred to cut it while young and juicy, (leaving the plant in the swathe a few hours,) for then the cow could eat every portion of the herb.

Horses thrive well upon lucerne; but here also the great error is committed, of letting the plant come into full bloom: hence the stalks, being tough and fibrous, are rejected, and scarcely three cuttings can be taken in the year. General success in the culture of this most valuable plant depends upon a good loamy staple, deeply wrought and manured in the first instance, and containing, naturally, fully 5 per cent. of chalk—my ground effervesced strongly, when tested with muriatic acid; and if any land fail to do so, it ought to be freely dressed with fine chalk.

The crop must be kept clean by the prong-fork or hoe, otherwise the native grasses will take firm possession of any and every space, produce at first and progressively irregularities, then patches, and finally an almost total destruction of the lucerne.

Sheep should never be permitted to feed over a plot of lucerne: their close bite injures the exposed crown, and speedily ruins the plant!

Space is not left to permit the consideration of other fodder plants which are essentially required by the domestic economist.

THE FORMATION OF A SOIL.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The subject of "warping," the recent theme of two useful papers in the last number of the *Journal of the Royal Agricultural Society*, is one full of usefulness, and this interest is by no means confined merely to the land-owners on the banks of the Humber. As I had occasion to remark in another place (more for the sake of the farmers of remote districts than for those of the county of York), warping is for the most part confined to the districts situate on the coasts of Lincolnshire and Yorkshire. The water of the tides that come up the Trent, Ouse, Don, and others rivers which empty themselves into the great estuary of the Humber, is muddy to an excess; insomuch that in summer, if a cylindrical glass twelve or fifteen inches long be filled with it, it will presently deposit an inch, and sometimes more, of what is called warp. (The water of the Thames, near London, will deposit as copious, and a still richer "warp.")

Now, warping consists in causing this muddy water to flow through sluices and channels on to the surface of the soil intended to be formed; and then, after the waters have, during a short period of rest, deposited their mud, the clear water is allowed to return to the river. This process is repeated at each spring tide till the soil is sufficiently formed, so that as Arthur Young long since remarked, the effect of warping is very different from that of irrigation; for it is not the water that works the effect, but the deposition of the mud, so that in floods the business ceases, as also in winter, when the water is far less muddy; the object of this practice is not to manure the soil, but to create it. The quality of the land intended to be warped is not of the smallest consequence; a bog, clay, sand, peat, or even a barn floor, are all one; as the warp raises it in one summer from six to sixteen inches thick, and in the hollows or low places, two, three, or four feet, so as to leave the whole piece level. Thus, a soil of any depth you please is formed, which consists of mud of a vast fertility, though containing not much besides sand.

When Arthur Young thus asserted the sandy nature of the warp or deposited mud, he fell into the natural error of a period when the chemistry of agriculture was nearly unknown. The recent analysis of Mr. T. J. Herepath (*Journal of the Royal Agricultural Society*, vol. ii. p. 101.) shows, so far from its being composed almost entirely of

sand, that in the 100 parts of the warp of the Trent are contained—

Animal and vegetable matter	7.003
Carbonate of lime (chalk)	9.775
Carbonate of magnesia	1.520
Potash and soda, combined with } silicic acid	0.085
Lime	0.905
Magnesia	2.684
Oxide of iron	4.465
Alumina (clay)	4.494
Perphosphate of Iron	0.092
Sand, &c., very finely divided	68.778

99.801

If the "warping" system was merely a local practise, not capable of material extension, still, it would be one full of interest to my readers; but if, as I believe, the system under the necessary modifications is applicable to many other districts besides the valleys of the Trent and the Humber, then how much more generally valuable does the practice appear! In the case of all muddy rivers, indeed, the application of the water to the poor soil near these banks is very desirable; it commonly occurs, however, that these poor low-lying soils are not to be found; nature has already in her deep rich valleys long since completed the warping by the deposits from her flood waters. This is, for instance, generally the case with the valley of the Thames; its meads need hardly any other deposit to form the staple of the soil, however benefitted they would be from irrigation with its water, abounding, as it does, with saline and organic matters. There are very many situations, however, where warping might be profitably carried on, and in situations where there is a total absence of water, a system denominated by Mr. W. Edwards, "dry warping" (*ibid*, p. 140) might be successfully introduced. By this plan the soil is actually carried on to the land by the aid of a temporary railroad. A soil, it will be well to remember, weighs per acre about 100 tons for every inch deep, so that if a soil is formed nine inches deep in the way described by Mr. Edwards, 900 tons would have to be carried. Now the plan adopted on the barren moor land of Hatfield-chase, in Yorkshire, has been thus extensively and profitably operated upon. "Dry warping," says Mr. Edwards, "is the spreading over-land the warp deposit or other soil to a depth of six, eight, or nine inches, and thus converting barren or inferior into fertile land ready

for immediate cropping. It is obvious that to do this economically, a considerable supply of the intended covering must be at hand; and though, perhaps, few estates in England may possess the peculiar advantages, in this respect, of Hatfield Chase, there are very numerous situations where the process may be advantageously adopted; and in Ireland it may be applied on a great scale, under conditions in every respect as good as at Hatfield, and thus, as Mr. Pusey observed, converting "the bog of Allen into the Vale of Aylesbury, or White Horse." Hatfield Chase is a peat moor of about 4,000 acres, lying above the level of the neighbouring corn lands. An act for enclosing the moor was obtained about 40 years ago, though for what object, at the time, it is not easy to see, as no one could have then anticipated the possibility of making the hitherto impassable morass of any value. By the public and private enclosure drains, it became, however, gradually firm land, and the existence of an old river course, that of the tidal river Thorne, or Idle, whose waters 200 years since had taken a new channel, was remembered; and Mr. Hatfield Gossip, of Hatfield Hall, who owns a considerable part of the moor, conjectured that the old course would contain an immense mine of the mellowed and rich alluvium deposited by the tides from the Trent and Humber. He conceived the idea of covering the whole moor with this alluvium; and to this idea, and to his determined perseverance and skill in carrying it out, we are indebted for the practical exposition of the advantages of *dry warping*. The process pursued by him is as follows:—A railroad is carried from the pit or excavation into the alluvial deposit over the moor to the part to be improved. Here branch railroads, formed in separate pieces of framework, are laid down right and left, from the main line. A stationary engine draws off from the pit the loaded waggons, which are then taken by a locomotive engine along the main line, and passed by the branches to the intended spot: here the waggons are tilted over, and the soil spread to a depth of six or eight inches. When the moor for seven to ten yards on each side of the branch is covered, the rail is removed by a machine traversing the rails, and which takes up the separate pieces, and deposits them in a fresh line with the

greatest expedition and facility; and thus, as Mr. Pusey remarks, "you see a sheet of firm and fruitful soil steadily spreading over the hopeless quagmire. The moor is thus covered at the rate of eight or ten acres a day, with a clean and friable soil, absolutely ready for seed day by day, as fast as it is levelled, for the fine alluvium does not require any previous exposure to the atmosphere. The rapidity with which the barren waste is converted into rich land, actually cropped, is a remarkable and interesting feature in the operation. The advantages of a well drained substratum of peat for grass crops have been long appreciated. Here the fresh coating of rich soil produces a slow decomposition of the old vegetable covering of the peat, as well, perhaps, as of the peat itself; and the roots of the grass or other crop striking deep into these, always find moisture and nutriment. The effect is, that most astonishing crops of clover, turnips, and particularly beans, have been grown on the newly warped land; and it has been found that the grass is green in the driest seasons, and possesses peculiar milking and feeding qualities. There is little question that as the system becomes extended and developed, the cost of dry-warping will be reduced. That on Hatfield Chase costs £15 per acre near the pit; but the average of that moor will be £18, including plants, on account of the extended carriage, &c. Tenants have been always readily found to pay £2 per acre for the newly warped land, and an offer with security is now under consideration for £2 per acre for the whole moor on a ten years' lease.

These facts will suggest to many of my readers the very natural inquiry, if similar improvements to those thus accomplished on Hatfield Chase might not be made in other districts besides those where alluvium is to be found? We all know what has been done in claying the peat soil of Lincolnshire, the sands of Norfolk, and even with blue shale on the gravels near Ferrybridge, by Mr. C. Charnock (287 tons, nearly three inches depth per acre); and the plan we have thus seen adopted on Hatfield Chase affords a fresh inducement for inquiry, and adds another fact to the many which must convince us all, that the general productiveness of the island has not yet nearly attained its utmost height.

CATTLE FOOD AND CATTLE FEEDING.

BY M. M. M.

The feeding of stock is now so generally understood to be so intimately connected with the successful cultivation of the cereals as to be the cheapest way of raising them, that to urge any further the

connexion between the two would be to go over ground that was generally admitted. Corn growing is a process which removes from the soil every element which is conducive to produce its like;

and, beyond even this, instead of corn, like grass, collecting, assimilating, and depositing any other elements in any great degree, it seems destined only to remove the whole. A plantation, for instance, by the large leaf-processes of the trees, collects the truant carbonic-acid gas from the air, forms it into cells and woody fibre, while the autumnal frosts take them periodically away, and they decompose on the ground, and form that manure so well understood by gardeners, leaf-mould—a carbonaceous manure most valuable to all great carbon-consuming plants. A turnip field derives from its large area of foliage another vast mass of carbonic acid from the atmosphere, which it leaves in the soil by the decomposition of the leaves and the fibres of the roots, the skins and “shells” of the turnips. A grass field also, or a field of clover, in the same way appropriates a large amount of the same gas from the atmosphere, and either leaves it on the land, or at any rate it is deposited in the farmstead where it is intended to be consumed. But a corn crop with its small leaf-process takes up less of this matter: its fruit is carried to a distant market, while only its straw remains.

Now, though the carbon, for instance, varies but little in the different kinds of crops per 100 lbs. weight, it is very different as regards the bulk per acre. Thus by 100 lbs. weight dried,

Wheat (corn) contains ..	46·1	per cent. of carbon.
„ (straw) do. ..	48·4	„ „
Red clover hay do. ..	47·5	„ „
Hay..... do. ..	47·1	„ „
Turnips do. ..	42·9	„ „

But a wheat crop of twenty-five bushels per acre, weighing 60 lbs. per bushel with the straw, will weigh two tons, and a turnip crop will weigh some thirty tons. But then the wheat crop will contain $85\frac{1}{2}$ per cent. of dry matter, and the turnip crop only $7\frac{1}{2}$ per cent. Thus a crop of wheat, such as we have before mentioned, will contain only one and a-half tons of dry matter, to speak in round numbers; while a turnip-crop will contain upwards of two tons of dry matter. Thus

The wheat-crop will appropriate	13·8	cwt. of carbon.
The turnip-crop „	17·2	cwt. of carbon.

Then if we take nitrogen, again, we shall see what a sad robber the wheat plant is; and here we will take that grain only as it goes entirely off; and we shall see what a deteriorating process it must be:—

Wheat contains of nitrogen	2·3	lbs. per cent.
Turnips contain of do.	1·7	lbs. „

Thus, while the former would contain and carry off a great portion of 154 lbs., the latter would contain only 38 lbs. No more surely need be said as

to the exhausting character of a corn-growing process, nor how necessary it is to keep a due proportion between “horn and corn.” Hence the great, we would say the leading, object of every farmer, anxious to extend the feeding of his cattle or his sheep, is, as well as making a profit of the animals to which his crops are to be given, to lay the foundation of a fertilizing growth of his grain crops as well.

The great object of all food taken into the system is, either to build up waste of structures or to afford the means of respiration. The two objects may be thus briefly and popularly explained. There is a continual waste and re-construction of the system. In youth the waste is comparatively small, because the vital powers are vigorous, and the construction is large for the same reason: there is absolute growth going on, as in old age there is absolute decay; because the vital energy, in the one case, takes up and assimilates a large quantity of the food given, and holds it so by a powerful and energetic affinity; whereas in the latter more is rejected and less appropriated, and there is more also lost from the feeble affinity with which the limited powers are enabled to hold it in the organism.

To make this clear, we need only show that in youth there is growth of flesh and bone, of teeth, and hair, and nails; whereas in old age there is decay and waste of flesh, of teeth, and hair, and every process of nature is slow and languid and heavy.

Now, animal heat is kept up by the consumption of that part of food which is of a carbonised or hydrogenized character. Reduced to the proper pabulum in the system, it comes in contact with oxygen at the lungs and the skin, and there by being burnt a regular heat is kept up in the system, and the voracious oxygen of the atmosphere has this to feed upon instead of feeding on the organs themselves; and if a quantity too small for this purpose is afforded to the system, the consequence will be that the destroyer will feed on the muscles themselves; and the subject will, if persevered in, die of starvation—its muscles will be burnt for want of the fuel food.

Now either food is given to build up the structures we said, or to sustain respiration. Most plants furnish both—but in varying properties: the one is composed of the gases—oxygen, hydrogen, carbon, and nitrogen; the other—oxygen, hydrogen, and carbon, only: while the former also generally contains with it in ordinary organic compounds—sulphur, chlorine, potash, soda, and phosphorus; and these, with some other matters of smaller consequence, as iron, &c., are always necessary to the proper building up of animal structures.

Now, if we take the proximate elements of several vegetables, we shall have a list something like this :

Sugar	Gelatine
Starch	Gluten
Gum	Albumen
Fat	Casein
Mucilage	Diastase

In the first column we have some of the proximate principles of plants most commonly of use in respiration-food ; in the second, some of those which are of more or less use in construction-food : the difference being that the first contains none of that substance common to all those in the second column, viz., nitrogen. But though these in the second column are nitrogenised, they are not entirely of the latter cast ; nitrogen being an element which plants and substances contain in proportions small in respect to their build ; the main parts even of these, also, affording only the means of respiration : or, in other words, being "fuel food." But the difficulty arises, what will be the effect of a supply to repletion of one or other of these materials ? Simply this :—If we supply more of the flesh and bone-forming matter than the system will take up, it will leave it in the manure ; but if we give large proportions of the fuel food, there are adaptations in nature for laying it up in her vast storehouse to be useful for a future day. Some animals have this power in a great degree. There are, for instance, those animals who pass the winter in a state of somnolency ; all the powers are languid and feeble, a torpid, sluggish nature leaves them to sleep away the ungenial winter ; but they have the power in their eating time, like the ant in summer, of laying on a vast accumulation of fat, which is something more than respiratory elements. This is consumed slowly by the sluggish respiration in winter : and the popular theory was never more correct than when it says that such animals are "*living on their grease.*"

Now, the efforts of breeders have been directed to increase the tendency to lay on this said fat : for if it be useful to animals to have a store of it for a day of future wants, it must also be useful to man to have it daily afforded him in a state fit for use : hence those whose laborious habits tend to the waste of a great quantity of the elements of respiration are the greatest lovers of the fat of animals, whether in the sheep, of the short-horn cow, the Leicester sheep, or the Chinese pig, because it affords, *ready formed*, the pabulum suited to their out-door occupations, and their great consumption of alimentary substances. But increase of fat is also accompanied more or less with increase also of muscle ; and hence it is necessary to the one that a liberal supply also of flesh-forming matter should be afforded to feeding animals as well as to growing

ones, partly because the waste of their bodies requires it, and partly because there is a small amount of flesh-forming, proceeding with a large degree of fat-forming.

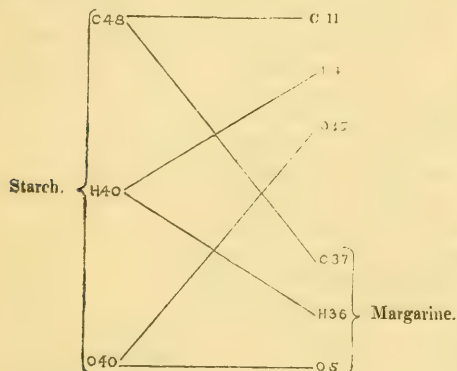
There has been no little error in this proportion of alimentary substances ; and it is not until a great deal of investigation takes place that this is entirely obviated. Mr. Lawes, for instance, in his very elaborate and talented paper in the *Journal of the Royal Agricultural Society*, went so far in this direction as to state that there is "in all cases a relation sufficiently evident between the increase of the animal and the nitrogen in the food to enable us to form some calculation upon the relation which should exist between the increase of the animal and the nitrogen in the food," to enable us to form some calculation upon the relation which should exist between the production of corn and that of meal upon a well-cultivated farm. And again he sums up his observations upon this head, as follows :—"One pound of nitrogen gives nearly five pounds of increase, live weight." Much as is the weight attached to a statement evidently hypothetical to begin with, and many as have been the superstructures raised upon it, we find that the subsequent experiments of Mr. Lawes himself induced him very considerably to modify his statements. The first glimpse of this appears in the third series of that gentleman's experiments, when he says, that although the amount of highly nutritive nitrogenous compounds consumed by the animals was very large, yet the increase produced was far inferior to that obtained from a less amount of them in the case of the former series ; and the results now to be detailed still further show that the value of the food depends materially upon other circumstances than the percentage of these substances in them. Again he states that "all the animals lost weight notwithstanding that the weekly consumption of nitrogenous compounds was considerably greater than in any of the other cases." Such a modification as this is, therefore, one which materially alters the views with what he set out in his first paper—a view which was at the time most vigorously battled by *The Gardeners' and Farmers' Journal* and other authorities ; and therefore attention is being again directed to the production of a fat-forming or carbonised substance combined with some nitrogenised compounds ; but above all one which is suited to the digestive organs and assimilative capability of the animal. At this step, therefore, arises the question, are we to expect fat to be the most readily produced by feeding animals on those vegetables which contain the most vegetable oil, or are we to expect the animal system to decompose the elements and reconstruct them into fat in its own system ? This we fear must be considered an un-

settled point. Liebig showed that it required a mere change of proportions to convert, say starch into fat. The formula may be thus stated side by side:—

Starch carbon 12; hydrogen 10; oxygen 10.

Fat, say margarine carbon 37; hydrogen 36; oxygen 5.

The following formula will give a simple idea of the conversion of four atoms of starch into one of margarine:—



Thus while 37 of carbon, 36 of hydrogen, and 5 of oxygen combine to form margarine; 11 of carbon, 4 of hydrogen, and 35 of oxygen are dissipated, a fine carbonic acid, and water, with a loss of oxygen.

Taking that which is perhaps the most natural, and assuming that vegetable fat is that which is the most easily transformed into animal fat, we shall find that it exists in a great many vegetables in considerable quantities, and in many seeds to so great an extent that it ranges from one to nine per cent. of the entire mass of undried vegetables. We will select a few instances to show the quantities:—

Meadow hay	.....	2 to 5 per cent.
Clover hay	.....	3 to 5 "
Pea straw	.....	1.5 "
Indian corn	.....	5 to 9 "
Beans	.....	2 to 3 "

The seeds, however, contain still greater proportions of oil, some peculiar to themselves. Thus,

Linseed	contains of oil	11 to 22 per cent.
Rapeseed	„	40 to 70 do.
Wheat	„	2 to 4 do.
Barley	„	2 to 3 do.

Several attempts have been made to turn this oil directly into fat. Hutchison's patent oil cake was amongst the modes adopted of incorporating the barley meal and linseed oil, and so to make portable cakes for the use of feeding animals. But amongst the most striking and daring experiments is that of Mr. Curtis of West Rindham, Norfolk. Commencing with poor bullocks, and anxious to get his straw converted into manure without pulling off the turnips, which in that county is so ill

borne by the land; having chopped straw he poured upon the mess for each animal a quantity of half a pint per day of linseed oil upon the mass. This was far from being relished at first; but by-and-by they became reconciled to their new food, and the quantity was doubled. When more accustomed to the mixture the quantity of oil was again doubled, amounting to a quart; and this was poured or rather sprinkled upon the cut chaff, which experience proved was necessary for the animals: the whole thoroughly mixed by turning; and a sort of incipient fermentation took place so as to affect the character of the whole mass. The precise details now expected from farming experiments were not then made; but it so far acted as a substitute for turnips to these animals as to have a very beneficial effect upon their skins, and their coats became shining and glossy: a proof, at least, of the utility of the preparation.

If, however, the oil as such is beneficial, it may be fairly expected that it is more so in the seed itself. That linseed is in the shape of cake out of which the great bulk of the oil is crushed there can be no doubt; but it is found by the most careful trials that if the seed be given whole to any kind of animal it will come from them whole, and but little effect will apparently be produced by its use. Crushing is therefore a very important, nay a necessary condition of the use of the raw seed; and even this given in any considerable quantity will produce purging and other unpleasant effects. It evidently requires some process of cooking to be available to the extent most beneficial to the consumer. Preparations of linseed are of old date. Amongst the first who used it we may name the late Mr. Bates of Kirkleavington, who adopted the use of cooked linseed as food for his herd of short-horns as long ago as 1791. This was a year when turnips failed, and on subsequent occasions in the years 1804, 1818-19-20. "In 1836," says he in a letter to the writer of this paper, "I bought linseed, and with conveyance (it being damaged by seawater, and sold by auction in a great quantity together) it cost me 1½d. per bushel; and I gave one bushel per week to fat cattle. I made a lot of excellent 3-year old steers which sold at £34 each, besides other cattle; and one cow improved for 20 weeks £20, being 48 stones at 5s. per stone: or £12, and in 30 weeks afterwards weighed 84 stones, and was sold for £32. The food given with the linseed was chopped straw of little value by itself. The improvement of the animals was great, and the cost of keep besides labour was trifling: leaving a return of 320 for 1, besides the straw and labour, to say nothing of the value of the manure so made."

Independently of the oil, however, the linseed

contains some seven per cent. of mucilage—a substance strictly analogous to starch, and one evidently of great use in the animal economy; and any system of cooking has the tendency of extracting this mucilage, which seems to leave the seed afterwards in a state more favourable for affording its proper modicum of food for the nourishment of the animal frame.

Mr. Clarke Hillyard, a veteran farmer, has tried several modes of preparing linseed. After properly crushing the seed, he steeped the meal in cold water for some seven days. This gradually dissolved out the mucilage, but as the process was tiresome he commenced steeping in hot water; and by this means so facilitated the process, as to be ready for use in two days: so much more rapid is the extraction of the mucilage. The most perfect system, however, he lays down to be the boiling of the following compound for 35 beasts:—

Three feeds daily of half a bushel of cut-hay	s. d.
which is 5lbs. each, and 4lbs. more at night (1½ cwt.)	3 6
Two pounds of boiled linseed each per day, weighing 50lbs. per bushel at 56s. per quarter	2 0
Two pounds of boiled potatoes	1 6
Molasses in the first instance to make the food palatable, ¼lb. daily	0 9
Turnips, quantity not given	2 6
Barley and bean meal mixed, 3½ gallons per day	1 9

Total cost of the 35 beasts 12 0
or about fourpence per head. The gross mixture cost, he says, 11d. per stone.

To Mr. Warnes, however, must be fairly conceded the honour of bringing out prominently before the agriculturists of England the value of linseed compound, and of urging the economy of the process. His system is one of boiling the linseed for a short period, and reabsorbing the mucilage when formed, with barley meal, or some similar absorbent. Springing from Mr. Warnes's plan have been several others, and a great variety of recipes given, for making different kinds of compounds.

We have taken a good deal of pains to select the exact recipes of one or two of the most successful compound feeders, and there is some difficulty in obtaining the precise quantities—much more indeed than at first sight would appear—for though several writers give exact proportions of each, few give the precise quantities. We think we have taken thus fairly from the different writers when we thus state that Mr. Warnes's compound is formed of—

Water	15 gallons
Linseed	21 pounds
Barley	63 pounds.
Chaff not given,	

The above is for 15 beasts one day.

Mr. Marshall's compound was much more liquid in its character. The following is the quantity allowed to each animal per day:—

Water	35 lbs. or 3½ gallons
Linseed	2 lbs.
Barley	5 lbs.
Chaff	10 lbs.

Both the above were exclusive of turnips.

We are acquainted with another gentleman who adopts the following proportions for feeding and milking stock:—

Water	1½ gallons
Linseed	1 lb.
Barley	2 lbs.
Chaff	1 bushel.

This compound was commenced with at first, until the cattle became accustomed to it, and afterwards the ingredients were increased. Beanmeal was mixed in the chaff, before the boiled mixture was poured on. In the two latter cases the food was given while hot; two hours only being requisite for the cooking of the chaff.

We will not attempt to deny, however, that the great majority of farmers still prefer linseed cake to any and all the various modifications of which linseed is capable; and contend that the parts left after the extensive oil is extracted are more fattening than even the linseed itself. Professor Johnston thus gives the relative analyses of linseed and linseed cake:—

	Linseed.		Linseed cake.
Oil	11.3	.....	11.93
Husk	44.4	.....	9.53
Woody fibre and starch	1.5		
Sugar, &c.	10.8		
Mucilage	7.1	.....	39.10
Soluble albumen	15.1	}	22.14
Nisoluble do.	3.7		
Fatty matter	3.1		Water 10.05
Loss	3.0		Ash 7.25
	100.0		100.0

On the analysis of linseed cake the professor remarks that the protein compounds in linseed cake are nearly equal to those in peas and beans; that there is more oil than either in oats or Indian corn, and therefore he infers that they are more useful both for fat and flesh-forming than any of these grains. Valuable, therefore, as he admits the cakes to be, he gives no comparative opinion as to these as against linseed itself; but this has recently been done by Professor Way, who has made an analysis of the cake as against the seed; and the observations he has made would almost provoke the inference that the former, in his opinion, exceed the latter; and if the two analyses placed above had been of the same precise seed, viz., one and the same

before and after crushing, there can be no doubt but the results would have been very different. Nobody, for instance, would suppose that a given weight of seed had more husk than the same weight of cake, because the oil of the latter being abstracted, the other parts must be exaggerated in their proportions. Again, the oil in the linseed and in the cake are nearly similar, which leads us to the conclusion that the seed *with its husk* had been at first analysed; and this analysis being copied by the professor from Leo Meiers; but he prefaces it by saying that it is an imperfect analysis.

Professor Way's analysis is not, however, by any means satisfactory. Excellent as it may be as far as it goes, the range of ingredients is so small that it scarcely gives sufficient data to enable us to determine the relative values; for though he gives oil, water, nitrogen, and ash, still he omits the other elements of respiration which are as important in all probability for the purposes of fat-forming, even as the oil itself. We may hope, however, that as the investigation is somewhat new, he will favour the readers of the Journal with his more extended and matured observations on the subject. He rightly states that the cake must contain less oil than the seed; but it also follows that as none of the albuminous principles are extracted, and hence the cake must be richer in this than the seed, it will be also in mucilaginous and saccharine matter but will it not also have a larger proportion of husk? He thus gives the averages of the seed and the cake:—

Nitrogen ..	4.35	....	4.57
Oil	34.76	....	13.52
Water	10.62	....	8.60
Ash	3.52	....	7.27

He well states—that connected, moreover, with feeding are the questions of flavour and mechanical condition; and as a matter of convenience, also, the feeder finds much more adaptation to the general routine of a farm, more portability, less time, trouble, and in every way less difficulty in the cake than in the seed; and we question whether this is not one great barrier against the employment of the seed.

The Professor disposes of the presence of sugar in cake and in linseed in a somewhat summary way; for he lays down the preamble that “it is hard to believe that in the presence of oil in abundance, nature should have recourse to sugar for the production of fat.” We are by no means satisfied that this is correct. It is found that a little malt or molasses even with the most oleaginous food, and so much tendency is there throughout nature to select change that we would submit with all deference that the saccharine and mucilaginous matter in both linseed and cake, may be selected to make

fat even when the oil is in absolute superabundance—and therefore regret that those elements are not given. We must bear in mind, also, that if the cake be richer in nitrogenous matter, it is also more abundant in the husk; and therefore the very small additional quantity of nitrogen may even be compensated for by the additional quantity of matter which generally comes whole from the animals. Thus English cake contains 4.57 per cent. of nitrogen. English seed „ 4.35 „ do.

Difference 22 less than one half per cent.

Russian cake is an exception, and contains more nitrogen; but still the difference is so slight as to make the value of a ton of each of comparatively little consequence in a practical sense. On the peculiarities of English cake as contra-distinguished from foreign, the Professor has some sensible remarks: for if his analyses of the specimens at all represent the bulk of the cake purchased, the results will be somewhat unexpected. They are, first, that the English cake contains the largest quantity of oil; and second, that the foreign cake contains the largest quantity of nitrogen. Well, we think, does he say, “This circumstance, which from the perfection of English machinery we should have been at first unprepared to expect, will go far to explain the superior softness and mellowness of English-made cake. How far it may influence the fattening properties I cannot pretend to say. It hardly admits of a doubt that to obtain the greatest advantage from a given weight of food either in feeding or fattening it is necessary that the flesh-forming, fat-producing, and heat-evolving principles should bear a certain proportion to each other.”

And if the refuse of one seed crushed and deprived of its oil may be of use in cattle feeding, and acknowledged to be nearly as good as the seed itself; nay more, if there is grave doubt as to whether it may not be even better, may not the refuse of other seeds be made available for the feeding of cattle? Rape seed, for instance, is crushed for its oil, and its cake is almost exclusively applied to the land direct as manure. May it not be—the question has been asked—applied in the same way as linseed cake, and given moderately through the stock?

Experiments have been made for several years to test the value of this kind of food, given with a view to the feeding of the animals; and many years ago, Mr. Charles Charnock, of Holmfield near Ferrybridge, gave it to his sheep, from the lambing of their mothers to the period of their sale to the butcher. On the continent it has also been used for feeding, especially cows and pigs, and in England, Mr. Pusey published as a discovery what was

doubtless a discovery to him, the capability of mixing it with linseed cake in the food of feeding hogs, commencing in the proportion of one-tenth of the former to nine-tenths of the latter, and increasing the proportions of the rape cake until it reached one-fourth of the mixture. Beyond this he found, with these animals, he could not go; but he found that Down ewes, less nice about their food, would take the rape cake by itself: nor were there any unfavourable symptoms in 500 sheep of Mr. Pusey's flock. This took place in the winter of 1848, or spring of 1849; and Mr. Pusey recorded it in the current number of the *Transactions of the Royal Agricultural Society*, in a note to the paper of Professor Way to which we have before alluded. In the autumn of last year he so far pursued the plan as to keep 700 feeding sheep on rape cake. He took, moreover, two lots of sheep of ten each, and put them up to feed—the one on linseed, and the other on rape cake; and not the slightest difference, he says, could be perceived between the two lots. What a pity that the expense and trouble of the experiment should have been made, and no accurate results, as tested by the scale, could be discovered! As regards sheep, Mr. Pusey's practice exactly agrees with Mr. Charnock; and as the flocks in both cases are trained to its exclusive use, so are they both eminently successful. But as regards cattle, Mr. Pusey thinks it can only be partially used—something like one part of rape cake and one part of linseed cake. As regards the composition of rape cake and linseed cake, the difference is extremely small: it is one rather of degree than of kind. This will be seen by comparing the composition of rape seed and cake with the table before given of linseed and its cake:—

Water	6.44	....	6.62
Oil	37.84	....	10.62
Nitrogen	4.21	....	5.58
Ash	3.31	....	10.41

We have certainly taken the better of two specimens of cake; but if compared with the analysis of linseed above given, it will be seen that chemically it is the same, and ought to produce much the same feeding effects.

The only objections which may be raised against its use are, that it has a hot unpleasant flavour and is at first often disrelished by sheep and cattle; and that there is a liability and possibly a danger of its producing scouring. We think, however, that if animals are accustomed to it sufficiently young, or before they have been pampered by feeding into an over nicety of taste it will be taken and relished.

We cannot help concluding that it is worthy of trial as a substitute for linseed cake.

While the English Society has been directing its attention to the seed of line, the Scottish Society has been doing the same as regards the seed of cotton. It seems to be a fact that the cotton seed is an oily grain, and that it is used in its crude state for the feeding of cattle in the East Indies. That it can be had there in large quantities, is more than equal to the weight of the cotton itself, and is purchasable in India for some 13s. or 14s. per ton; so that if the freights were at all reasonable, we might expect to have it brought to this country at a very small cost. The oil expressed has been submitted to some oilmen in Leith, and they said it is, though not a very valuable, at least a valuable article.

Then we have the cake, which, though neither so valuable in degree, is equally valuable in kind with the linseed and rapeseed product; and Professor Anderson thus gives the analysis:—

Water	11.19
Oil	9.08
Sugar	10.70
Albuminous compounds (containing nitrogen 3.95)	24.69
Ash	5.64

The seed itself in its uncrushed state contained 3.56 per cent. of nitrogen.

Assuming that the price for which it could be sold would be *much* below that of linseed cake, and how far it might be used alone, or mixed with rape or linseed cake, time alone can try. But we would ask, might it not be advantageously cooked as food for stock as the withdrawing of the oil? A costly process would be prevented, if it were so, especially as that article does not appear to be of a very first-rate quality.

Expectation was raised at one period as to the value of the Indian corn as a feeder of stock; but the trials of many individuals who were tempted by its price to give it to their stock, have been altogether so unsatisfactory that they seem to have now very nearly discarded it from use for that purpose. Attempts have been also made to introduce the Dari or Dhoora grain, which contains some 11.19 per cent. of protein compounds, and was in Professor Johnston's opinion equal to wheat-flour; but it would evidently not be worth importation from the distance it would be to bring; and we must mainly look at some low-priced nutritive article in these times of low prices: for high-priced cattle food, and beef at five shillings per stone, are perfectly irreconcilable.

BURTON-ON-TRENT FARMERS' CLUB.

The Burton-on-Trent Farmers' Club held a meeting on the 1st of August last, at which the President, Thomas Gisborne, Esq., took the chair. There were present Messrs. Lyon, Faulkner, Hellaby, J. Gretton, W. Greaves, J. Lathbury, Adams, G. Greaves, A. Bass, W. Daniel, W. Hollier, Webster, of Coalville, &c., but the attendance was not so numerous as at the former meetings of this year. After the usual business of the evening had been gone through, Mr. W. Greaves was called on to offer the remarks he had engaged himself to prepare on the subject appointed for discussion. He accordingly read the following paper "On the consumption of grain with stock, and on the value of grain as food when compared with root crops and with other provender":—

It is generally admitted that in order to make land yield its highest degree of profit, it must be so cultivated and managed as to make it yield the highest amount of acreable produce. In proportion as we arrive at the highest degree of fertile power of the land the profits are greater in farming it. But experience very plainly declares to us that it is only by a judicious plan of increasing the fertility of land that profits are proportionately increased. Every day it is seen that large crops and small profits are reaped on the same land. That fact, however, says nothing against the principle of high farming, but only teaches us caution in avoiding expenses in labour, in manure, and in plans of managing stock, which increase, indeed, the produce of the land, but conjure the money out of, and not into, the farmer's pocket. I shall begin my subject with a brief allusion to the primary causes of the fertility of land as regards the mode of cultivation and rotation of crops. We know that crops require food to live on, which food is partly composed of mineral substances and partly of substances which are yielded by the decomposition of animal or vegetable matters. Mineral substances cannot be made; they must exist in the soil, or must be added artificially. Not so, however, the organic substances; for plants have the power of partly building up their organic structure from the ingredients of the air they breathe, and of the water they absorb by their roots. It is clearly demonstrated by strict experiments that plants need in the soil a considerable quantity of these organic matters in order to make the soil yield a large crop. But the fact which is most to the purpose of my present subject is this, namely, that very different proportions of this kind of substance are needed for

different kind of crops. Some crops make more manure than they consume, while others consume more than they make. Mr. Lawes, who instituted many well-directed experiments with a view to elucidate this fact, has attempted to show the quantity of manure, that is, of the main ingredient of organic manure, ammonia, required by corn crops, such as wheat, barley, oats, &c., and the quantity made by such crops as turnips, vetches, &c. He puts the case in this way. Suppose you have land, which without manure will yield 20 bushels of wheat per acre, then a certain quantity of manure will be required to raise the yield to 30 bushels. He collects from his experiments that, for every bushel of wheat above the natural yield of the soil, a quantity of manure will be needed equal to 5 lbs. of ammonia. But say that the land without manure will yield three tons of turnips per acre, then the addition of the same quantity of manure which was needed to produce an additional ten bushels of wheat will produce in the turnip crop an additional 10 or 12 tons. But in the 10 bushels of wheat would be contained only about 12 or 13 lbs. of ammonia, while they consumed more than 50 lbs. of that substance in the manure. In the 10 or 12 tons of turnips, on the contrary, would be contained more ammonia than was added to the soil in the manure. Now in various seasons very different results will follow on any experiments of this kind; I do not, therefore, think we are yet in a condition to say, with any precision, what amount of manure each crop consumes or yields. Still the main result of the experiments is perfectly proved, that cereal crops do exhaust land, and that many green and root crops enrich it. There is not a practical farmer who will not subscribe to that opinion, for every man has tested it for himself. It is frequently seen that when land is capable of yielding from 10 to 20 tons of turnips without additional manure the addition of a superphosphate of lime will double the crop. That fact proves that in favourable circumstances the turnip crop can find its own ammonia to a very large extent. Well then, high farming simply means the keeping of the land full of manure, so as to make it yield corn crops of the largest possible bulk. In order to effect this, there are obviously three methods open to us; first, we might grow corn crops seldom, and green or root crops frequently, and thus make much manure; secondly, we might grow corn crops more frequently, and consume a great part of the corn with cattle and sheep so as to enrich our manure with

the ammonia yielded by them; thirdly, we might grow corn crops and carry them to market, but buy manure, such as guano, bones, &c., to repair the waste. I think the choice of one or other of these methods, or a mixture of them, is just now the most important circumstance which can possibly engage the attention of farmers. I wish very much I could see my way clearly to any certain reasons for preferring the one or the other method, but I do not profess to be able to speak positively on such doubtful points. I shall nevertheless offer a few considerations, which may possibly assist others in getting a clear view of the difficulties which beset the question. Perhaps in some circumstances it is better to follow one course, and in some another; but whatever is done should be rightly done, and I am persuaded that great mistakes are too frequently made, both in the manner of growing green and root crops, and also in the consumption of corn by cattle and sheep. What I have said of the much greater power of manure to yield produce in green crops or roots, proves that it is greatly preferable to apply the bulk of our manure to those crops. You apply 20 tons of manure to the vetch or turnip crop, and you get 25 tons of produce. By eating part of the crop on the ground there remains enough condition in the land to produce a full crop of barley. If the seeds get a dressing of manure they will yield three tons of produce, and after them the land will grow as much wheat as will stand. But then what kind of manure must the 20 tons be which you thus add to the soil for the turnip crop? If you consume in the yards and sheds 25 tons of turnips, 3 tons of seeds, and the straw of the wheat and barley crops, they will yield you 30 loads of manure. Whether you consume part or all this produce on the land or not does not materially signify, because in either case the land is just as much benefited. But will the manure be rich enough to produce the best crops? I think not. On the contrary, I think it necessary to consume with the seeds, straw, and root or green crops a portion of corn of some kind. If you do so consume corn, then you will raise the bulk of the turnip crop by five or ten tons, and all the other crops in like proportion, and you can carry all your turnips off the land, for the barley will even then be full rank. Now taking Mr. Lawes's calculations as a basis—but I do this not, as I have said, in implicit reliance on their correctness, but as approximations merely to the real fact—but assuming his data, the addition of a certain portion of grain to the food would be necessary to yield an additional 5 or 10 tons of turnips, or an additional 10 bushels of wheat. But this certain portion would vary as he used different kinds of grain. There would be required 60 lbs. of ammonia; but it would require very dif-

ferent quantities of barley, oil-cake, beans, or peas to yield it, because the different descriptions of grain contain very different quantities of the peculiar kinds of substance which yield ammonia. Mr. Lawes reckons that about one-fifth of the ammonia is wasted in the bodies of animals, and four-fifths found in their excretions, of all the food they consume. A ton of beans consumed would thus yield in the manure about 80 lbs. of ammonia, a ton of oil-cake 45 lbs., a ton of oats 30 lbs., or a ton of barley 25 lbs. Now, as in three cwt. of good Peruvian guano we get the 60 lbs. of ammonia for about 30s. of cost, it becomes a question for us to ascertain whether we can consume corn and oil-cake to such advantage with cattle or sheep as to make it better worth our while to enrich the manure in that way instead of buying guano. We can only do this by calculating whether, say 1½ tons of oil-cake will pay for consumption, when we reckon in the 30s. worth of increase it makes in the value of our manure. Now whether grain and oil-cake will pay for consumption by cattle and sheep must depend entirely on the quantity of meat a given quantity of grain will yield when compared with other kinds of food. Grain and oil-cake costs the farmers a certain price whether he grow them or buy them, and grass, hay, and turnips another given price. But the cattle fed on the one kind of food must come into competition with those fed on another kind, and of course they will reap a profit who feed them on that which returns most meat for a given cost, and they will suffer loss who feed them on that which gives least meat for the same cost. If a grass beast can be sold at 5d. a pound it will be so sold, and a corn-fed beast will fetch no more though it cost 6d. a pound in feeding. Will it pay, therefore, to feed beast or sheep on oil-cake or grain, as well as it does to feed them on grass or other food? That is the question for us to try to settle. I calculate that grass-land worth to rent 45s. an acre with other payments will yield 20 weeks' keep for a full grown beast. I add 15s. an acre for care of stock and other labour, &c., on the land. We have thus 3s. a week as the keep of a full grown beast, exclusive of any return for interest of money on outlay in stock, &c., or for profit. The same acre of land would yield of mown hay, reckoning mowth and aftermath 50 cwt.—that is 2½ cwt. of dry hay for every week's keep of the beast. The cost of making, gathering, ricking, &c., of the crop would be 30s., so that the cost to the farmer of hay would be somewhere about 2s. per cwt., exclusive of the cost of attending the cattle which consume it, and the cost of making and conveying back to the land the manure, or of the farmer's profit. Now, in every ton of hay is contained nearly 10 cwt. of nutritive substance, of which sub-

stance it takes $1\frac{1}{2}$ cwt. to keep a full grown beast a week, at a cost of 5s. But it takes five tons of Swede turnips to furnish ten cwt. of solid nutritive substance, and therefore, counting that substance of equal value with that in hay, the five tons would be worth £2, or 8s. per ton. If, however, a beast be fed wholly on turnips, such a beast as would eat $2\frac{1}{2}$ cwt. of hay, it would consume more than 15 cwt. of them weekly; which 15 cwt. would cost 6s. according to our calculation just made. But in grain, almost the whole of its substance is nutritive, and calculating oil-cake or barley, or beans, to serve as nutriment in the same ratio as hay, a full-grown beast would consume of either of them $1\frac{1}{4}$ cwt. per week. This quantity would cost at even present prices 10s. It is evident, therefore, that if we were to observe no caution in mingling one kind of food with another, one would pay very much greater profit than another. To use oil-cake alone, or turnips, or corn, would be great folly; and on the other hand, I think it almost equally inexpedient to consume hay alone, and still more straw. You see that oil-cake or corn costs double the price that hay does, and treble what pasturage does. If, therefore, you cannot so consume these more expensive kinds of food as to make the beasts return for them double or treble what they do for hay, you cannot reap the same degree of profit. You hear many people say that turnips are only worth 3s. or 4s. a ton to consume with cattle. Why, any one can consume food to waste who tries; and it is by no means difficult to make even corn pay only 3s. or 4s. per cwt. for feeding cattle or sheep. But I think, if corn or turnips be consumed properly, they will return a much greater amount of meat, &c., than other things, in proportion to their bulk. For instance, a beast will eat 15 cwt. of turnips or $2\frac{1}{2}$ cwt. of hay per week, and will perhaps yield 10 lbs. of increased weight. But in these turnips is one third more nutriment than is in the hay, and that third is wasted. Let the food of the beast be half the hay and two fifths of the turnips, and it will return more meat for what costs you less. A beast which eats two cwt. of turnips daily consumes in them 20 gallons of water. The consumption of such an excessive quantity of water wastes a great part of the nutritive substance. A beast does not want more than eight or ten gallons of water daily, reckoning what it drinks and what it gets in its food. You thwart nature, therefore, in giving more than one cwt. of turnips daily to a beast; and inasmuch as you do this, you prevent that full health which makes the beast lay on fat in the greatest degree. But now as to corn and oil-cake. Do what you will you cannot get more than a certain amount of weekly growth in a beast, and our business is to get that amount at the least cost. If a

beast eats $1\frac{1}{4}$ cwt. of hay and 63 lbs. of oil-cake a week, it will perhaps yield 12 lbs. of weight in the time. If it eat half the quantity of oil-cake and make up with hay, it will perhaps yield only 10 lbs. But the additional 30 lbs. of oil-cake will cost 2s., which is twice what the substituted hay will cost, and the extra growth of fat will not, therefore, pay for the extra quantity of cake.

But it is by mixing hay and corn with roots that the cheapest and most productive diet is made. If the $1\frac{1}{4}$ cwt. of nutritive substance is made up of such a mixture, it will yield much more than when the diet only includes two, and double what it will when it only includes one of the ingredients. Suppose you give a beast

Hay, 1 cwt.	2s.
Turnips, 5 cwt.	2s.
Oil-cake, $\frac{1}{4}$ cwt.	2s.
	—
	6s.

the cost is 6s. a-week on our calculation. The return of a feeding beast for such a diet would certainly be nearly double that yielded by $2\frac{1}{2}$ cwt. of hay given alone. It is not, therefore, fair to estimate the value of roots or oil-cake by what they will do alone, but by what they will do when mingled in the most judicious way. I wish, however, to point out to you that by feeding beasts on gathered food wholly, the farmer must yield up his profit on the immediate crops, and must look to get his return in other crops, which are made larger by the system of feeding. I do not see how hay, turnips, and oil-cake are to pay more than the 6s. which I have set down as the cost of a feeding beast per week, which excludes all the farmer's profit. As far as he can, it is therefore the interest of the farmer to consume his provender on the ground and without storing it up. This cannot be done with turnips advantageously when large crops are grown. He must consume them in the yards or sheds, and through the winter. But I by no means look on the consumption of either turnips or corn and cake with feeding beasts to be the most profitable mode of consuming them. I think that if you eat with young beasts a mixture of straw, turnips, and oil-cake or corn, they will pay better than feeding beasts. And by doing this you save the expense of gathering so much hay and consuming it unprofitably. It is too much the practice of farmers to stint the young stock. You see yearlings put up in the yards in autumn, which come out in the spring not with one shilling more than when they entered them; all this food has been wasted. Now the straw is thus of no value except in the manure it makes, so that we may reckon that as nothing. Then let a young beast be kept as follows:—

	s.	d.
Straw, 1½ cwt.	0	0
Turnips, 3 cwt.	1	2
Oil-cake, 10lbs.	0	10
	2	0

Such a beast will increase in value in twenty weeks £3 to £4; thus paying more for the turnips and oil-cake by half than a feeding beast will, while the manure will be nearly as much benefited by a ton of oil-cake, whether it be consumed in one way or the other. Young beasts I think yield a profit, exclusive of the value of the manure. I am aware, however, that if the practice of winter feeding were to become less general the price of winter-fed beasts would of course rise until they yielded as fair a profit as other stock now does. But we have to do with actual circumstances, and it would be a rare thing if we could alter the general plan of farmers as to raise the price of feeding stock to the profitable point. I shall only slightly allude to the consumption of turnips by milking beasts. It is, no doubt, the most profitable way of consuming them; and, whatever may be thought of the profit of a turnip crop to others, it is certainly a fair one to the dairy farmer. Now as to the question whether it be more profitable to grow root and green crops or to consume corn, I think much depends on the way in which we set about growing them and consuming them. From what I have said it is to be inferred that I consider turnips as equal to gathered hay—taking weight for weight, the actually nutritive substance in each. Perhaps, however, turnips are as valuable as corn or cake when contrasted with those articles in the same manner. A ton of turnips ought to go as far in feeding and for other purposes as two cwt. of corn, and so I make little doubt they will when they are rightly used. That would give 16s. per ton as their value. But let us consider them of what value we will, when compared with other things, it makes the farmer's profit no greater, so long as he cannot get from them more than he gets from a given amount of pasture. I do not think, therefore, you can set them down as worth more than from 8s. to 10s. per ton. A turnip crop of 25 tons would thus be worth from £10 to £12. The expenses of tillage, &c., without reckoning the cost of manure (which manure is of course given back in the consumption of the crop by cattle), would be about this:—

	£	s.	d.
Three ploughings and harrowings . . .	1	16	0
Carting and filling manure, 30 loads . .	0	15	0
Drawing up drills twice	1	0	0
Seed	0	3	0
Two horse hoeings and two hand ditto	0	12	0
Gathering and housing 25 tons	1	5	0

5 11 0

Extra attention on cattle and care of manure in yards	1	0	0
	£6	11	0

Now in these 25 tons of turnips there is the equivalent of the produce of 2½ acres of pasture, which I have reckoned at £3 per acre, and it is therefore seen that we get in the turnips for £6 10s. as much as we get in the pasture for £7 10s. The turnips, therefore, are the more paying crop. But what becomes of the calculation of 8s. or 10s. per ton for the turnips, or even 16s., which we have been talking about? You will bear in mind that it was only in comparison with other winter food that those calculations were made. The turnips are valuable to that extent when so contrasted; but my argument is that no winter feeding is profitable, because of the expense of gathering and storing the food and of conveying manure back to the land. The profit of winter feeding must be in its indirect influence on the general profitableness of other crops. But, as according to my view, a crop of 25 tons of turnips barely pays its way when compared with pasture feeding, what can be said of growing such crops as from eight to eighteen tons? Why, only this can be said, that it is certain they cause much loss in themselves, and only pay in the corn crops, which are made larger by means of them. What I say of turnips will hold in the case of other green and root crops.

What I have thus feebly endeavoured to demonstrate may be summed up in two or three sentences.

First, I wish to impress on you that green and root crops may be made profitable when very large ones are forced from the land, and not else.

Secondly, that except on a judicious plan of consuming corn, it is preferable to supply an artificial stimulant in our manure by the purchase of guano.

Thirdly, that generally it is only the addition of a small quantity of corn or oil-cake to other provender which makes it profitable; and that under present circumstances young growing stock will pay better for it than other kinds.

Fourthly, that it is only by judicious mixing of various kinds of provender that we can get from each the greatest amount of profit.

An animated conversation followed the reading of the paper of Mr. Greaves, but only portions of it were preserved in the report of our correspondent.

The PRESIDENT said he doubted very much the fact that any crop returned to the land more manure than it consumed. He agreed that such men as Mr. Lawes and Mr. Huxtable were very good reasoners; but what he desiderated was sufficient experiment to base their reasonings upon. He had a field, part of which was fallowed and part sown

with turnips, which were eaten on the ground; but the subsequent corn crop was better on the fallowed part of the land. How was that fact reconcilable with the assertion that the turnips yielded more manure than they abstracted from the soil? The whole theory of Messrs. Lawes and Huxtable required a severer trial than it had yet been exposed to; and for himself he rather doubted if ammonia was capable of all the effects attributed to it.

Mr. G. GREAVES: Put the case of a vetch crop which is ploughed into the soil: would not the land be richer than when the vetches were sown? Mr. Lawes said rightly that part of the ammonia yielded by a crop was wasted in the bodies of the animals that consumed it; but when this waste was avoided the green crop increased the amount of manure in the soil.

The PRESIDENT said the case might be as stated by Mr. Greaves, but he had seen in Cambridgeshire the practice of ploughing in crops of spinach, &c., and he did not think the land enriched by the plan. But perhaps it might be objected that these were not the best plants to grow for the purpose of ploughing in. Now he had a field of land which he had just taken to, and which was occupied chiefly by a magnificent crop of kedlocks. Could Mr. Greaves give him the comfortable assurance that he possessed in this green crop the source of fertility to the land?

Mr. W. GREAVES did not recommend the growing of weeds for the purpose of enriching the land, still he had no doubt, when tilled and ploughed under, they were useful in the soil. For his part, if called on to choose between a poor and clean farm and a poor and dirty one, he would prefer to enter on the last; one would be quite exhausted, but the other would contain the material of future fertility.

Mr. HOLLIER had conversed with Lincolnshire farmers, whose practice it was to sow white mustard in autumn on their land. They cleaned the land first, sowed it, and when the plant was six or eight inches high ploughed between it, afterwards they ploughed the full crop under, and excellent crops of corn were got in this way. He had a field of ten acres, which he sowed in autumn with mustard. On nine acres the first sowing failed, and on that part he sowed over again. But the one acre which stood at the first sowing grew luxuriantly, and was eaten off by sheep. The other part was eaten too. In the subsequent corn crop the one acre was much the best in the field.

Mr. G. GREAVES said in his opinion there was no more important question for farmers than that which related to the proper mixture of the food of cattle and sheep. Some kinds of food might be less profitable than others. He would not say that

root crops always were profitable. But what was a farmer to do in winter without some kind of succulent food? You could not keep cattle in health without some kind of green food or roots, nor consume dry fodder and corn to a profit without them. There were not in straw and corn the salines necessary to the health of animals. Dry food alone would never yield a profit, because animals could never be healthy for long together when fed on it. The same principles applied to the treatment of cattle as of men. At the time of the potato disease the poor people of the towns were compelled to live wholly on bread and other dry food. The consequence was that scurvy became a very frequent disease among them. Turnips, cabbage, &c., were to cattle what potatoes were to men, and made other food digestible, wholesome, and nutritious.

The PRESIDENT inquired of Mr. Greaves whether he had rightly stated the quantities of ammonia yielded by the various kinds of grain?

Mr. G. GREAVES believed the quantities were calculated from the analyses of several chemists of repute; but he had seen later analyses by Professor Way, which made the proportion of nitrogen in oil-cake as large as in beans.

Mr. LYON would not say that he had considered the opinions advanced in Mr. Greaves's paper sufficiently to decide on their soundness, but he could say that the remarks were of very great interest to the farming community.

Mr. G. GREAVES, in answer to questions on the point, said that grass fulfilled the same part in the constitution of animals as turnips and other succulent food; and it was as proper to mingle corn with grass in summer as with roots and cabbage in winter. He should say that though beans were better for some purposes, yet for feeding beasts he supposed oil-cake would be better. As to the quantity to be given he could not believe that more than four or five pounds daily could ever be profitable with beasts at grass.

The PRESIDENT had found that beans were the best food for milking cows. He was keeping a large dairy now on grass and bean meal. The plan suited his land, though it might not be fit for other descriptions. His was a poor land, which would not bear mowing, and which required artificial manure. He had, therefore, adopted a plan which enabled him to pasture the land through the summer and enrich it at the same time. He bought his beasts in ready for the grass day in spring, and after milking them through the summer sold them off when the grass failed. They had four pounds of bean-meal each a-day while grazing a good pasture. He chose them more for feeding qualities than for milking; because his object was to keep up their condition, and have them fat enough

to make the same price or more than when sold out in the autumn as when he bought them as incalvers in the spring. He had now 70 cows which cost him an average of £8, the prices ranging from £6 5s. to £10 10s. They were for the most part little Irish beasts. He expected they would make nearly £10 a-head when sold out. He was making now six cheeses, of thirty pounds, a-day; and he reckoned the average produce for the summer at 2½ cwt. for each cow. For his cheese he obtained 52s. per cwt. last year, and one of the gentlemen now in the room who bought it had told him that he had since given 60s. for a worse sample. His Egyptian beans cost him about three farthings a pound—that is 22s. per quarter, besides carriage home. He grazed his cows about 20 weeks; and each beast ran over 1½ acre of his poor land. That was his way of mixing food, and he thought it a good one on his own land. One advantage of giving corn to milking beasts was that no labour was required in fetching them from the field; they came regularly to the pail of their own accord when the trough was filled with something they liked better than grass.

Mr. WEBSTER thought a beast fed wholly on Swedes would scarce consume 15 cwt. per week, as stated by Mr. Greaves.

Mr. W. GREAVES had no doubt he had rather under-stated the quantity which a full-sized beast would consume.

Mr. HELLABY, in reference to the question whether it was profitable to consume turnips alone, said that his sheep, though kept in fair store order, did not get fat on turnips.

The PRESIDENT asked if beasts could be made fat on turnips and straw?

Mr. W. HOLLIER said his brother-in-law fed his beasts in that manner, and brought them in good fat condition.

Mr. WEBSTER quoted the opinion of a very good farmer in his neighbourhood in favour of good barley straw and turnips; he preferred it to hay.

Mr. HELLABY quoted another good farmer's experience to the same effect.

Mr. FAULKNER found his sheep fatten on turnips alone; he, however, preferred to give a little oil-cake or beans with them.

Thanks were voted to Mr. W. Greaves for the trouble he had taken in preparing his paper; but the club came to no determinate resolution on it.

The President, at the end of the meeting, promised to be present at the next, which is fixed for October 17th, when Mr. Lyon will introduce a subject of great interest to the notice of the club.

NOTES ON AMERICAN AGRICULTURE.

It is matter of general complaint in the United States, that the government has done, and does so little in disseminating useful information on agricultural subjects. Some, however, consider this as fortunate, inasmuch as it causes private societies to make known improvements with more energy than otherwise they would be inclined to do, if relying upon governmental assistance. "It puts us," remarks a farmer to the writer, "on our mettle." Farmers who were formerly very apathetic in all matters regarding agricultural improvements begin to see that it is for their interest to endeavour to raise a bushel of corn where formerly they were content with half a one. As in all such cases, competition is doing good; it is astonishing how much benefit one scientific farmer is to his neighbourhood. Apart from all pecuniary considerations, the spirit of emulation raised produces exertions on the part of his neighbours to equal him in his improvements. One or two good farmers, from the best agricultural districts of England and Ireland, have done more to create a desire for good agricultural knowledge in certain districts of the States than any other cause. The result of the last harvest in the United States will also be a great exciting cause

to more earnest endeavour in this matter; there has been a great deficiency in the crops, and the somewhat rare event has happened of wheat being quoted at higher prices in America than in English ports.

The following is an instance of what may be considered good farming in America, being the product of 100 acres, the farm of Mr. James Gowan, Mount Airey, near Philadelphia, in one season:—

120 tons of hay at 18 dollars, 400 bushels of wheat at 1 dollar, 300 bushels of rye at 80 cents, 100 bushels of oats at 40 cents, 1000 bushels of corn at 60 cents, 500 bushels of potatoes at 75 cents, 900 bushels of carrots at 40 cents, 600 bushels of rutabaga turnips at 25 cents, 600 bushels of sugar beets at 40 cents, 1500 bushels of turnips at 12½ cents, 15 hogs, 45 cwt. of pork, at 5 dollars, cattle, calves, and pigs sold 347 dollars, net sales of milk and butter over 1500 dollars. Total, 6,725 dollars 50 cents. Stock kept, 50 head of cattle, 7 horses, 30 swine. Paid for labour during the year, 1,000 dollars. Sixty-seven dollars' worth of produce for every acre of the farm, and fifty-seven after paying for labour—a sum much above the average price of land per acre in Pennsylvania. Mr. Gowan has great advantage in being near a large market (though there are thousands of farmers as well

situated in this respect who do not produce one-fifth the quantity on 100 acres); but the enormous amount of produce above stated affords a striking proof of what may be done by wisdom in planning, and perseverance in executing.

The following are Mr. A. W. Franklin's statements of profitable and unprofitable farming; the prices mentioned will be interesting, as affording a means for comparing them with the prices here :

We take the article corn for illustration (although the principle will apply to every other product), because it is the great staple of grain agriculture and a magnificent vegetable. We doubt whether the luxuriance of the tropics can present a more pleasing sight than a rich field of growing maize, with its forest of dark green foliage, and teeming with the promised harvest. We are the more proud of our country that can claim this plant as a native of the soil. Statement of the cost of cultivating two fields of corn, and the quantity produced in each :—

No. 1.—DR.

	Dol.	Cents.
Interest on 2 acres of land worth 50 dollars per acre	6	0
Fifty loads of manure, at 25 cents (1s.)	12	50
Spreading the same, 1 day's work, (3s.)	0	75
Ploughing and harrowing, 3 days ..	4	50
Ploughing second time, 2 days	3	0
Furrowing and drilling 25 loads of manure, and planting, 6 days....	9	0
Manure, 25 loads at 25 cents	6	25
Seed 50 cents (2s. 1d.), ploughing and hoeing twice, 10 dollars	10	50
Expense of gathering	5	0
	57	50

CR.

By 90 bushels of corn per acre at 75 cents	135	0
Corn fodder and manure made	20	0
	155	0
Difference	97	50

No. 2.—DR.

	Dol.	Cents.
Interest on 2 acres, worth 15 dollars per acre	1	80
Ten loads of manure, at 25 cents ..	2	50
Ploughing and harrowing, 2 days ..	3	0
Planting, 4 days, 3 dollars; seed 50 cents	3	50
Ploughing and hoeing, twice	7	50
Expense of gathering	3	0
	21	30

CR.

By 15 bushels of corn per acre, 75 cents	22	50
Fodder and manure made	5	0
	27	50
Difference	6	20

Little manure, much labour, little crops, little profit. This system, No. 2, practised on a large scale, say 20 acres, would assuredly make a much larger difference, but it would be on the wrong side. If No. 1 had spread his manure at the same rate as No. 2—viz., 5 loads to the acre—he would have cultivated 15 acres; still the better quality of his land might have overbalanced the extra labour required, and saved him a profit. If No. 2 had put all his manure on one-fourth of an acre of land, and cultivated it with as much care as No. 1, he might have obtained as large an amount of produce in proportion to the value of his land, and save more than three-fourths of his labour and expense.

The gentleman who has furnished these tables says, that he is convinced from experience, and from his own observation of the tillage and crops in various sections of the country, that there is an amount of human labour, and wear and tear of cattle and implements, thrown away on every one of the *old States every year* upon poor crops—sufficient to build a railway, or construct a canal across the state. By labour, he means the useless toil of running over five or ten acres of ground for a crop, which, by proper management, might be produced on one.

The reader will doubtless be struck with one thing, in perusing the evidence we have given illustrative of the increased and increasing attention given to good cultivation in the United States. This is, if there has been in bypast years such a large surplus of their crops left for exportation to this and other countries—obtained, be it remembered, by defective farming—what must be the result in this respect, of good scientific cultivation? The answer is obvious: from it will the British farmer perceive that it is his closest interest to look well to his doings, to take advantage of every improvement made known in his important calling.

Before proceeding to the consideration of other matters, we here append one or two important statistical statements relative to the condition of agriculture in some of the oldest States. The first is that of New York. There are fifty-nine counties in that state; the population is 2,604,495, the number of acres taxed 27,726,549, and the aggregate valuation 616,824,955 dollars. The agricultural counties are the wealthiest, and the rate of taxation very low. The poorest portions are the heaviest taxed. From the late census, it appears that the following was the amount of crops raised, and the average

produce per acre. The latter may, however, be considered as too high :—

	Number of acres.	Bush els raised.	Average per acre.
			bushels.
Barley	192,503	3,108,704	16
Peas	117,379	1,171,503	15
Beans	16,231	162,187	10
Buckwheat ..	255,495	3,634,679	14
Turnips	15,322	1,350,332	88
Potatoes	255,162	23,653,418	92.7
Wheat sown..	1,013,665	13,391,770	13.5
Do. harvested	958,234		
Corn	595,135	14,772,114	24.8
Rye	317,099	2,966,322	95.5
Oats	1,026,915	26,323,051	26
		lbs.	lbs.
Flax	46,089	2,897,062	62½

The number of improved acres in the state is 11,757,276 only, little more than one-third of the number of acres taxed. Number of neat cattle 2,072,330, cows milked 999,490, butter 79,501,733 lbs., cheese 36,744,976 lbs., horses 505,155, sheep 6,443,855, fleeces 4,607,002, wool 13,864,828 lbs., hogs 1,584,344.

In Pennsylvania there are fifty-eight counties. Population in 1840 1,724,033, number of acres taxed 28,198,380. The value of agricultural produce of the state of Massachusetts in 1845 was 23,192,703 dollars, and of this some ten millions and a quarter may be taken as the value of the live stock. The whole amount of the results of other labour, and the employment of capital, was 124,735,264 dollars—showing greatly in favour of other articles produced over agricultural produce. But it should be remembered that Massachusetts is one of the principal of the manufacturing states in the northern part of the Union. The number of cattle in the year alluded to was 276,549, the value 5,327,199 dollars. The value of 65,181 horses equal to 3,451,118 dollars; 354,943 sheep, value 558,284 dollars; 104,740 swine, value 917,434 dollars. The value of the grain 2,228,229 dollars; hay 5,214,357 dollars, potatoes 1,309,030 dollars, butter 1,116,709 dollars.

Ohio is remarkable for its rapid growth, both as regards population and wealth. Fifty years ago the population did not exceed 20,000, “consisting of a few hardy pioneers toiling in an almost pathless wilderness; now the population is nearly 2,000,000, and their accumulated property 500,000,000 dollars—the third, if not the second, state in the Union. The valuation of the taxable lands and buildings in 1847 was 259,093,635 dollars. Horses 15,005,263 dollars, cattle 7,572,172 dollars, and sheep 1,758,438 dollars.

As a means of comparing the agricultural

wealth of the New England or Northern States with those of the South, and as a slight contribution towards the consideration of the question which has been so often mooted, “How could the Southern States do without the Northern?” we give the following :—

The States of Maine, Massachusetts, New Hampshire, Vermont, Connecticut, and Rhode Island have a population of 2,422,000. The States of Georgia and Tennessee have enjoined a population of 1,694,000. The relative products, according to the census of 1840, showed the following :—

	NEW ENGLAND.	GEORGIA AND TENNESSEE.
	Bushels.	Bushels.
Corn	11,943,000	83,585,000
Wheat	2,898,000	9,911,000
Potatoes	20,582,000	3,792,000
Rye	2,582,000	448,000
Oats	11,247,000	9,458,000
Buckwheat	1,097,000	
Total	50,348,000	107,194,000

In addition to this, Georgia and Tennessee produce annually about 15,000,000 lbs. of rice, and probably 3,000,000 bushels of sweet (Carolina) potatoes, none of which are raised in New England. They also have, according to the census of 1840, 1,906,851 neat cattle, and 4,484,362 swine; whereas, the six New England states have but 1,545,273 neat cattle, and only 748,698 swine.

This state of matters explains the fact why living, provisions, &c., are so cheap in the Southern States; and from this may be seen the advantage those states will have over the North in commencing manufactures. Labourers and operatives could live one-half cheaper at Georgia or Tennessee than at Lowell. Great efforts are making in the south to establish manufactures.

In scarcely any department of cultivation has there been such a decided improvement as in that of fruit. At present, throughout the whole Union, there is quite an excitement in the object of raising fine fruits. Numerous societies have been formed for the purpose of giving encouragement to cultivators, and not a few of the pages of the agricultural papers are devoted to accounts of improvements, and of new fruits raised. It is the general opinion that the time is not far distant when the export of fruit will exceed in amount (that is to say, if there is a demand for it) that of any article of export. The following is an account of the old-fashioned mode of proceeding in planting orchards :—

The enterprising farmer who concluded to plant an orchard, would go to a tangled swamp of young apple-trees called a nursery, in one corner of his own or his neighbour's mowing field, where, eight or ten years before, a load of pomace from the cider mill had been scattered and ploughed in, and, after

a good deal of labour in hewing away the underbrush, be able to select his trees. The selection consisting in choosing straight handsome trees, the fruit was of course all guess-work. The tools employed in taking up the trees were, a hoe to clear the surface, an axe to chop off the roots, and a pair of oxen and chains to tear a stubborn tree from the ground. With the roots and bark all torn and mangled, they were thrown loose into a cart, carried to the site of the future orchard, tumbled on the ground, for the full action of the sun and wind. Then, or perhaps next day, commenced the operation of "setting in." With a hoe, and sometimes the aid of a shovel or spade, holes were dug nearly the shape and size of large milk-pans, into which the roots were thrust, and doubled and twisted, then the earth thrown in and rammed or stamped till it was hard. We have known men of good sound sense, and good judgment in common matters, practise this within our recollection (and the number of stunted, scraggy, consumptive orchards in all parts of the country is conclusive proof of our statement), and we doubt not the same mode is still in vogue in some, if not all the States, at the present day.

We need not say that this unscientific slovenly mode of operating is fast becoming unfashionable. It is another proof of the great carelessness of American farmers. The West is becoming, to use the words of an American writer, "fruited" with fruit trees. It is curious and instructive to think of hardy races of settlers, clearing these lands of what may be called the unproductive natural growth of trees, just to make way for a second covering of timber, teeming every year with loads of grateful fruits. On this point the Rev. Mr. Beecher says—

Forty years ago the population of Indiana did not exceed 20,000. The first settlers carried with them the seeds of fruit trees, and these were nearly all that the State produced until the last 10 years. Now look at the present enterprise on this subject, and the future prospect. During the past year (1844) there have been planted in this State at least 100,000 apple trees. Every year the demand increases, and our farmers are increasingly zealous in pear cultivation. A few years ago, to each 100 apple trees, our nurseries sold perhaps two pear trees, now they sell 20 to the 100. The demand for pear trees has been such that our nurseries have not been able to answer it, and they are swept almost entirely clear. Apple trees not under *ten feet high* sell at ten, and pears at 20 cents (5d. and 10d. each), in some nurseries apples may be had at six cents (three pence). During the season of 1843-4, apples of the finest sort sold at my door, as late as April, for 25 cents (one shilling) *a bushel*, and dull at that. The effects of such a deluge of fruit is worthy of some speculation. Fruit will become more generally an article, not of luxury, but of ordinary diet. A few years, and the apple crop will become a matter of reckoning by farmers and speculators, just as is now the potato crop, the wheat crop, &c. Nor will it create a home market alone. By care, it may be exported with such

facility that the world will receive it as part of its diet. Nor, if I inherit my threescore years and ten, do I expect to die until *the apple crop of the United States shall surpass the potato crop in value*. It is a permanent crop, not requiring annual planting, and it produces more bushels to the acre than corn, wheat, or, on an average, potatoes. The pear and the apple are to hold a place yet as universal eatables—a *fruit grain*, not known in their past history. Without planting another tree, this county (Marion) will in ten years produce 200,000 bushels of apples. Suppose the 90 counties of Indiana to have only 25 trees to 160 acres of land, the crop of 15 bushels to a tree would be nearly 2,000,000 of bushels.

To judge of the value and importance of this crop to the agriculturists of the States, it must be remembered, that what we have been describing as the flourishing condition of only one State is but the type of others. In the Northern States there are numberless orchards, not only pear and apple, but of peach and other fruit trees. "There are peach orchards in New Jersey and Delaware occupying upwards of a hundred acres each. There is one at Reyholds covering a thousand acres. The crops of this latter orchard are so large as to give constant employment to two steam-boats and a schooner in conveying the fruit to market." And attached to almost every farm there is a large or small orchard. One of the most striking curiosities of New York, in the fruit season, is the various steam and sailing boats bringing their freights to the market. Last year we frequently went to the markets, and were abundantly repaid for their trouble. We certainly never expect to see such a gorgeous display of fruit again. As might be expected from the statements we have given, fruit is everywhere cheap. Peaches, large, luscious, three a-penny of our money; some particularly large, one and two cents, sometimes four cents a piece—the latter would have been charged a shilling or two here. The crop of apples was last year considered a failure, and yet we have bought three beautiful ones for a cent. No one in this country can have an idea of the amazingly rich flavour of some kinds of American apples. Those so highly prized here as real Americans convey no idea of the best quality of fruit to be obtained for a mere trifle in the fruit-growing States.

In noticing some of the peculiarities of American farms and farming, one cannot fail to be surprised at what has been termed the "horrible slovenliness" of American agriculturists generally. And first as to fences. They may truly be said to be of the rudest description. So far as we can recollect, we did not see a real good-looking English fence during our visit, and we have been in the best agricultural district of the State of New York. We will describe one very favourite form—we may call it the zigzag fence. A number of wooden rails, or

pieces of scantling, no matter how rough and crooked they may be, are first obtained. One rail is laid in the ground, then another is laid so as to form an angle with the first one, its end resting on that of the first. A third rail is then laid on the end of the second and forming an angle therewith; and the same is done with a fourth rail, and so on. Other loose rails are laid upon them, until a proper height is obtained—this is generally four or five feet. The whole forms a peculiarly unstable-looking fence, but it is in reality very strong, and capable of resisting considerable opposing force. The whole is upheld without the assistance of a single nail, or other fastening. It is this peculiarity, doubtless, that has caused it to be adopted. It is, however, obvious that, in its construction, a vast quantity of wood is uselessly expended. This, however, is of little moment in the interior, where wood is so plentiful. The farmers are very fond of this species of fence, ugly and cumbersome as it is. "So stupidly attached to this form of fence are some old people, that when they build wall fences they build them in and out, in the same zig-zag way they have been accustomed to do their rail fences." As may be supposed, the gates in farms are quite in keeping generally with the rudeness of the fences. Posts are driven in on either side of the gateway; and in the inside of these, holes are cut at equal distances; in these holes rails are inserted—of course loosely—all of which have to be removed when a cart, for instance, is required to pass through. Regularly hung gates are sometimes used; these are, however, rude enough in their construction. "To balance a gate, you will see the topmost piece of timber extended five or six feet over the post to which it is attached. On this piece of timber you will sometimes see a trough filled with stones, while at other times a huge piece of wood is attached." It is needless to say that, in all well-conducted farms, the fences &c. are admirably constructed and arranged. This unfortunately is the exception, not the rule. But the fences and gates are not the only things displeasing to the eye of the scientific farmer. The appearance of some of the fields of a comparatively new tract of land is peculiarly odd. On clearing land the trees are cut down some three feet from the ground; the stumps thus left are allowed to remain in the ground till they utterly decay. They are generally black and scorched looking; this is owing to their being burnt, which prevents vegetation from proceeding after the trees are cut down. This, as may be judged, has a tendency to preserve the wood for a much longer period than otherwise would be the case if allowed to remain unburnt. One enterprising farmer told us that he never burnt the stumps, but allowed them to remain to decay

naturally. The period taken in such cases is ten years; when charred, much longer. The stumps thus left, almost invariably burnt and charred, present a curious appearance when they peer up amidst the green herbage surrounding them. A stranger, at first sight, is exceedingly apt to take them for diminutive cattle, or black sheep, scattered over the field. The following is a description of land in the very best farming district of New York State—the far-famed Genesee county. We give it here, as it forms an admirable description of the slovenly confusion too often seen in the neighbourhood of farms. We have toiled through such a place, in the heat of summer, within gun-shot of a farmhouse belonging to a farmer who was considered quite a scientific agriculturist. "Weeds, and rough-looking grasses, and fallen trees, which seemed to have been rotting for ages; old stumps, some black and half-burnt, others grey and half-rotten. Trunks of trees, some ten, some twenty or thirty yards in height, some rotten and ready to fall; some sound, and some strong; some black and half-consumed by fire, some crumbling to pieces by decay, some split, some hollow, some fallen, some standing; some with their roots pulled up, but most with their roots in the ground; some amidst the grass, some in the orchards, some amidst the corn." Fancy such a scene and condition of affairs on an English farm!

The agricultural implements in the United States are much lighter in construction than in this country, the ploughs particularly so. These are well adapted for the peculiarities of the land. It would be impossible to plough land recently cleared, with all the stumps and roots scattered here and there, with the heavy ploughs of this country. It is astonishing to see how easily the farmer turns aside from the stumps; and even should he fall foul of one, the plough is so light, that he can *fillip* it past the obstruction very easily. Old Country farmers are disposed to find fault with them, but they are soon taught to perceive that they are very well adapted to the kind of labour they have to perform. With reference to other implements, the same rule holds. The hay-forks are amazingly light and handy: a young boy can easily use them. Scythes, hatchets, &c., are all made exceedingly light and portable, and in this we think the Yankees show real wisdom. There is no real utility to be gained by having huge heavy instruments to deal with. A farmer who had had, both in this country and in America, much experience as a hard-working man, told us that the result of his experience was, that more work could be done in the same space of time, and with less of fatigue, with the Yankee tools than with those of this country. The axes used for felling trees are very

light: we must confess that, at first sight, we thought that heavier heads would have been better; but a sight of the execution they performed in good hands, on the sturdy sons of the forest, soon showed us our mistake. The "horse rake" is almost universally used for gathering the hay off the fields, and forming it into "cocks." There is scarcely such a thing as reaping corn by hooks, as here performed, the common scythe, or more generally the cradle-scythe, being used. It is astonishing how much one man can cut down in a day. There is great rivalry in this point amongst farm-servants. Oxen are invariably used for farm purposes, carting of hay, &c. Some of these animals are really wonderfully well paired. A friend of the writer's had a pair so beautifully matched, so alike in every respect—colour, size, and even shape and length of horns—that it was difficult to distinguish between the two. The same farmer had a young pair which he was rearing for the purpose of exhibiting at the great State fair: their colour was pure white. We believe he gained the first (or one of the first) prizes for well-matched oxen. Farmers vie with one another in rearing handsome well-paired oxen. Much more attention is paid now than formerly to the rearing of stock. The cow-houses are all constructed of wood, and have arrangements for feeding and housing, very peculiar. In the centre of the house there is a division railed off on each side; on this walk or central alley the fodder is placed. The cattle are ranged on either side. By lifting up pieces of wood, placed in these rails, space is made for allowing the animal to insert its head and neck, so as to partake of the fodder within the inner division. The piece of wood is let down, thus confining the neck and head of the animal in one position till released. The cattle seem to have no objection to this kind of restraint. The horses are invariably slender, and at first sight a European fancies that they are too much so to do much heavy work. This is not the case: they are high-spirited, and capable of undergoing much fatigue. They are used for all kinds of work: no such thing being seen, so far as we remember, as horses kept for one particular kind of jobbing. After a hard day's work in the fields, the spirited animal is glad to have a run of ten or twelve miles harnessed to a "buggy," conveying perhaps the younger branches of the family to a "frolic" in the neighbourhood.

The farm-houses are generally made of wood, placed in some cases in low stone basements to protect them from the damp. They are commodious, and generally well-arranged: the kitchen is always the largest apartment in the house. The most striking external peculiarity of American farm-steadings is the long range of wooden outhouses, and the entire absence of all appearance of

grain, &c. The former is caused solely from the fact that the corn, hay, and in fact all crops, are housed, not made up in stacks as here done. This custom necessarily requires large and commodious outhouses to be constructed.

As may be supposed, vegetation proceeds very rapidly. In the Northern States, though the winter can scarcely be said to be broken up till April, barley is generally ready to be cut early in June; wheat is ready towards the end of the same month. Oats are ripe in July, Indian-corn in September, and the buck-wheat crop immediately succeeds the corn. It is scarcely an exaggeration to say that, after a slight shower during the night, succeeded by a fine sunny day, you see the crop growing. Certain it is that, measuring barley stalks in the morning, you will find in the evening no mean addition to their length. This rapidity of growth causes the crop of oats to be generally a poor one; it grows so rapidly that there is no time for the grain to fill properly. A farmer in the State of New York informed us that, with all his care, and in spite of all his knowledge of the crop (he had been a Scotch farmer), he could never depend upon a good return. And yet his meal was fast getting into repute. The Americans are generally fond of oat-meal; indeed, it fetches a high price; but yet the supply is exceedingly defective. Indian-corn is the staple commodity of American farms; it is used in all kinds of ways. One variety is taken in its green state and boiled. Its flavour is remarkably fine, and resembles very much that of green peas. Judging from our own experience, we should say that it would take some time for a European to relish the vegetable; it is too sweet and rich for all tastes. The Americans are amazingly fond of it. Indian-corn is sown in what is called "hills." Some species grow very high; we have seen stalks ten and twelve feet in height. It is a noble-looking plant. The varieties are very numerous. Dr. Brown of Philadelphia enumerates upwards of forty kinds. The editor of the *Maine Cultivator* says that it would be an easy task to make out sixty varieties. The growing capabilities of the various species differ very much. Some spring quickly up, and soon ripen; others spring up more slowly, and ripen later. Some have six or eight rows of grain in the ear, others have as many as twelve and fourteen. In some the grains are all of one colour, in others variegated—yellow, mixed with red, scarlet, purple, and black. These are, however, very small. Indian-meal is much relished throughout the States. Indian-meal porridge, or "hominy," as it is there called, is very delicious, when taken with new milk. Pumpkins are generally grown between the "hills" of Indian-corn plants; they require very little tending, and grow to an immense

size. A yard, and even a yard and a quarter, is no uncommon size to be found. These pumpkins are wholesome and nutritious food, both for man and cattle. "Pumpkin pie" is considered a great treat. Rasp and brambleberry trees grow in great abundance in the woods. We have wandered for miles through a wood, and have been surrounded with berry-bushes. We recollect once of emerging upon a cleared space, which had been cleared some ten or twelve years before, and which had an undergrowth of berry-bushes so thickly set, that the plentiful crop of red raspberries gave a decidedly red hue to the surrounding space. They are small, but rich and luscious. They are gathered in large quantities, and boiled with a little sugar, and partaken of largely by the farm-servants at almost every meal. Nothing can surpass the beauty of the hanging clusters of wild grapes to be found in the woods. In some places they are amazingly plentiful; above and around, on all sides, the graceful pendants are seen. They are, however, very small, and exceedingly sour. By careful cultivation, they attain to a larger size and finer flavour. Farmers are beginning to see the importance of their cultivation; they are easily reared, requiring no great care. In the State of Ohio the hazel-nut trees are found in the woods in amazing quantities. They grow very low, not much higher than our gooseberry bushes, but they are very prolific. In every district where there is plenty of wooded land, there are numerous varieties of wild fruit-trees bearing wholesome fruit—such as cranberries, elderberries, and winter gooseberries. The elderberries are of a much finer quality than those in this country. Apples for domestic use are first peeled or pared (by a machine in most cases), and cut up into four or six pieces, and strung upon ends, and hung up to dry. They keep for any length of time. By putting these dried part of apples along with a little boiling water and sugar, a delicious dish is readily obtained, equal in every respect to stewed apples.

The wages of farm-servants vary in different States and localities. We here give a statement regarding them. In a large State, such as New York, wages will vary considerably in different sections; the average is endeavoured to be given:—

	Per day, cents.	Per month, dollars.
Maine, New Hampshire, and Vermont.....	62	12
Massachusetts, Rhode Island, Connecticut..	75	12 to 15
New York.....	50	10 to 12
New Jersey.....	75	12
Pennsylvania and Ohio	50	10
Maryland and district of Columbia (White) ..	50 to 75	10

	Per day, cents.	Per month, dollars.
* Virginia, North and South Carolina, Georgia, Kentucky, and Tennessee (White) ..	50	10 to 12
(Coloured)	25 to 40	5 to 10
Alabama and Mississippi	25 to 30	12 to 15
Louisiana, Florida, and Arkansas	50	15
Indiana, Illinois, and Michigan	50 to 75	8 to 12
Iowa, Wisconsin, and Missouri	75 to 91	10 to 15

"The States marked thus * are grouped together, as they present very similar features of position and distribution of population. They all embrace lowlands and highlands. In the former slaves perform nearly all the manual labour; in the latter there are comparatively few slaves, and white labour predominates. In the table the wages of each are consequently given. In the States further south-west labour is nearly all performed by slaves, but is more valuable because more productive, arising from greater fertility of soil." With regard to wages, or at least as to the quantity of provisions the same amount will purchase in the old States and the new, there is a remarkable difference. In the western States, the necessities of life are but half the cost of the same in the New England States. Thus, in Indiana or Missouri, two dollars and a half (a week's wages) will buy a barrel of flour, or twelve bushels of corn and potatoes, or 100 lbs. of pork; while in Massachusetts three dollars (a week's wages) will buy only half a barrel of flour, or four bushels of corn, or six bushels of potatoes, or 50 lbs. of beef or pork. Emigrants from England and Ireland make a sad mistake in seeking work in America as farm-servants—which is in asking too high wages. On this point the *New York Tribune* has the following excellent remarks:—

The first idea of a European landing here and seeking work is high wages. He does not consider that he is utterly unacquainted with our implements and modes of doing things; that he can seldom plant, or mow, or fence in *our way*, nearly so fast as a born Yankee; he sees only that a Yankee gets twelve or fifteen dollars per month for farm-work, and he insists upon having so much. But he cannot go forward and do as the Yankee does; he can hardly keep up with him when placed beside him; and, however athletic and faithful, his services are not worth so much per month as the Yankee's. Suppose he can get but seven dollars a-month on a farm, while the Yankee who works beside him gets fifteen—let him never mind the disparity, if he has a good chance of learning our American ways of farming. That is the great point. Let him learn to do as we do first, and improve on our ways as much as possible afterwards. A single year will

suffice, if he be docile and observing, to give him dexterity in our ways. After that, he will be equal to any American, and may command as good wages, *possibly better, as he will understand many Old Country ways which, in their place, are superior to ours.* We may here give the average rate of the following trades, generally in demand in the agricultural districts of the States. A day-labourer, one day's labour, 1 dollar; carpenter, 1 dollar 45 cents; mason, 1 dollar 62 cents; farm hands, 9 dollars per month; servant-maids, 1 dollar 25 cents per week. In all these the wages are considered as inclusive of board. This varies more than labour in different sections of the country. In New England two dollars per week is a fair average of a labourer's board, in the Western States one dollar. During the short season of harvest, labourers will command one-half more wages per day in all the great agricultural districts.

The style of living in American farm-houses is very patriarchal. The farmer and his family rarely, if ever, dine or take their meals by themselves; the farm-servants always sitting at table. At a farm-house there is no distinction of persons; the visitor, of whatever class or station of life, must sit down with the farm-servants, and the "help" of the family in general circumstances, and the same attention is paid to all. The living is very good, plentiful, and wholesome. Immense quantities of butter are made use of. We were surprised to see farm-servants eat butter, in no measured quantity, along with fat pork. The hours of farm-servants are very long. In the summer-time work is generally begun at four o'clock in the morning, breakfast taken between seven and eight, work till twelve, dinner, a half an hour or so for resting, then till six, tea, and the labours of the day are finished by milking the cows and attending the cattle. It is generally near eight o'clock before the day is fairly finished. The farm-servants have thus little time left to themselves. If they are inclined for amusement they may have it; a ramble in the woods, a game at quoits, seem to be the most favourite mode of amusing themselves. As a general rule, farm-servants are a very sober, quiet, industrious class, rarely spending their time and money in public-houses, or needlessly. A sober and industrious man has a fair chance of saving as much money in the course of twelve or eighteen months as may enable him to "go West" and purchase a small lot of land. "The American labourer, if frugal and temperate, may have his own lot, and house or cottage, and good furniture in it. By the aid of his cow, his garden, female industry, and good management, he may save his wages entire." Many eminent professional men and statesmen have had just such an humble beginning, and a great majority of wealthy farmers have begun in a similar position. A great help to parties with small capital

is the facilities given for the purchasing of land. In very few cases, indeed, is the purchase-money at all demanded. The general way of doing business is paying by yearly or half-yearly instalments. Where the purchase-money amounts to four or five thousand dollars, the time may extend over a period of six or seven years. Credit is universally given; farming tools and seed, &c., can be got on easy terms. We here append one or two instances, showing the price at which good partially cleared lands may be obtained in agricultural districts. For a farm of 92 acres the price was 1700 dollars, or about £360. On the farm there was a large and commodious house, extensive out-buildings, barns, &c. Of the 92 acres, about 80 were cleared. In the wooded portion are beech, hickory, walnut, butternut, chestnut, and other trees, besides abundance of grapes, peaches, alderberries, blackberries, raspberries, &c. The orchard is some acres in extent, all the trees bearing delicious fruit. There is a constant running stream, running down the centre of the farm; a good many excellent springs. A canal passes through the estate, and a river bounds one end of it. With all these natural and artificial advantages, such an estate could not be got in this country for less than three or four thousand pounds. The whole of the taxes, State and local, amount only to £3 10s. per annum. No. 2. A farm of 164 acres, 60 acres in wood the remainder cleared, a very superior house; the stables, cow-houses, granaries, &c., in first-rate condition, and the arrangements admirably made, price 6000 dollars, or about £1200. This may be looked upon as rather dear; nevertheless, from the admirable arrangements of the buildings, their good condition, the richness of land, and beauty of pasture, it was considered cheap. No. 3. 209 acres, 100 acres well wooded, excellent house and out-buildings, plentiful supply of water, price £4 per acre. No. 4. 6 acres, about one-third of an acre laid out as a garden, 4 or 5 acres in fields, the rest in wood, plenty of water and well situated, a commodious house, with standing crops, £75. Parties can get uncleared land prepared for cultivation at a cheap rate. Men are easily found who are willing to clear the timber, and give a sum per acre for it into the bargain. This varies from 7 to 11 dollars.

It is worthy of remark, that the real American farmer is amazingly fond of change; he may be said to be always emigrating, never settling. However comfortable he may be, he is always contemplating the possibility of being off, sooner or later, to other "diggings." An offer of cash down will decide him at once; he will soon strike a bargain and be off. Often as they change, they are "cute" enough to change always for the better. Americans are considered to be the best original settlers; they

seem to have an aptitude for clearing land. On the other hand, they fail generally in improving lands, probably from the want of trying, or the requisite knowledge. English farmers make poor original settlers, but they almost invariably succeed in improving cleared or partially cleared lands. With reference to uncleared lands, its quality may be judged of by the following rules, given by an American hand-book:—"Throughout the northerly portion of America, land which is timbered ought to have growing upon it tall and strong hard timber, such as the maple, elm, bass-wood, cherry, hickory, white ash, butternut, and the like. If the land in which any of these kinds of timber is found is dry, as it usually is, the land is good land. The trees should, as a general rule, be tall, and branching only near the top. The land which bears the timber we have now named, or some kinds of it, is sure to be good."

The roads leading from the farms to the villages, and even to the large towns, are very badly constructed; they are really, as a Scotchman gravely remarked to the writer, "awful." In summer the quantity of dust is positively amazing, in winter the mud is equally striking. In the "fall" and "spring" seasons—that is, at the beginning of the rainy seasons and the breaking up of the winter—they are sometimes almost impassable. A farmer informed us that, having occasion to go to a mill some two miles distant, it took him nearly three hours, and his horses were quite exhausted with their efforts. In districts sufficiently populous to pay for their construction, a species of road is laid down, called a "plank road." These roads are excellent contrivances, and facilitate the communication between farms and market towns very much. Although they are of comparatively recent introduction, immense tracts of country are laid with them. They are supported by tolls, those in the state of New York demanding six cents (three pence) for a single-horsed gig or buggy, for a run of eight or ten miles. The mode of laying them down is very simple, and may be briefly described:—The line of road is marked out and levelled as much as possible. As they are generally laid down in the track of roads previously made, the centre is raised, leaving a hollow on each side, into which the water may run off from the planks through small holes or drains. A track little broader than the breadth of a coach or waggon (if for a single line) is marked out; and on each side of this, planks some 8 or 9 feet long, 8 inches broad, and 3 thick, are laid parallel thereto. These are laid end to end, thus forming a double line of planks along the road. On the top of these side-supports, the planks on which the carriages run, forming the roadway, are laid; these project a little beyond the side-sup-

ports; they are generally some 10 or 14 inches broad, and 2 or 3 thick. The side of the embankment is brought up so as to cover the ends, and the road is complete.

Land in the West is generally what is called "prairie," being grassy, and not woody. The soil is amazingly tough. It takes from three to five yokes of oxen and a large heavy plough to break it up; one man driving, the other holding. Two acres per day may be broken up—the average cost of each acre being one dollar and a half. The breaking up is generally performed about May or June; if planted with Indian-corn a good half crop may be obtained. Wheat may be put in at autumn, or, if delayed till spring, it will be in fine condition for corn.

A sod crop is raised as follows:—When breaking up the sod, corn is dropped in every third or fourth furrow, close to the right or outer side, and is covered by the next furrow. It springs up and grows; no hoeing is needed, and frequently a crop of 30 to 60 bushels is produced. If put in early, this crop will come off in season to harrow in a crop of wheat, which is done without any further ploughing. Land in the Far West is very cheap; 1 dollar 25 cents per acre is the government selling price, 160 acres from which is called a quarter section; 40 acres of public land is the minimum quantity that can be purchased. Farms ready for cultivation may be bought near markets at prices varying from 10 to 15 dollars per acre, but plenty of land may be had on condition of giving one-half of the three first crops, or according to bargain. The following will show the general rate at which farms may be purchased, and made ready for cultivation:—

A quarter section of prairie land, 160 acres, at 5s.=1 dollar 25 cents	....	£41	13	4
Timber, say 40 acres (generally found at the borders of streams)	.....	25	0	0
Breaking up the sod at 6s. per acre, say	.....	50	0	0
Fencing into four lots, 8 rails high, and stakes, 960 rods, in 3 miles 15,366 rails at 1 cent, 153 dollars 57 cents, and 3840 stakes at half a cent, 19 dollars 20 cents	.....	36	0	10
A comfortable log cabin, such as settlers first occupy	.....	10	8	4
Other small buildings	.....	10	8	4
Cost of a well, with pump and buckets	.....	3	2	6
Garden, cow-yard, hog-pen, and other fittings	.....	15	0	0

£191 13 4

ESTIMATE OF FARMING IN WISCONSIN.

Cost of 200 acres prairie land, at 1 dollar 25 cents per acre	250 dollars.
Fencing	400 "
Breaking up	480 "
Seed	160 "
Harvesting and thrashing	400 "
	1690 dollars.
Product, 22 bushels per acre, at 55 cents	2200 "
Difference	510 dollars.

After the first year, the farm being fenced and the land subdued, a crop of 3500 bushels can be raised at a cost of less than 1000 dollars.

The following is the Hon. Mr. Ellsworth's statement regarding the mode of farming, as practised in Indiana:—

I was offered 16 bushels of corn as rent per acre instead of one-third of the crop, which is the usual share for the landlord. I preferred, however, the one-third, and got 20 bushels, the season being very favourable, and the land yielding 60 bushels, and some as high as 80 bushels per acre. 50 bushels is a good crop, and, when the hazards of the season are considered, 16 bushels per acre may be called a good rent. With this conviction, I have rented 1000 acres of ground for 16,000 bushels of shelled corn, delivered in the crib. While corn is so easily raised, it may be asked what is its value? At present (June 1, 1846), the price at Indiana on the Wabash, about midway between Cincinnati and Chicago, is about 20 to 25 cents the bushel for exportation to New York, by the lakes and canals, or to New Orleans by the Ohio and Mississippi. But most of it is consumed in fattening hogs and cattle as follows—in the mode of feeding cows there is a diversity of practice:—Some graziers turn both cattle and hogs into the field, to consume what they wish. The fat cattle and fat hogs are first admitted, and follow each other, then the store cattle and store hogs. Hogs will not pull down corn faster than they wish to eat it. Cattle do more injury, yet the hungry hogs will glean up most that falls on the ground. I have serious doubts which is the most advisable mode—whether to cut the corn and feed it, to stack in pens, or to let them consume it in the field where it grows. The usual mode, however, is to cut up the corn, stack it, and feed it out. I have been able to hire land with a corn crop on it at 2 dollars.50 cents to 3 dollars per acre, the average yield being 50 bushels. The cost per bushel standing in the fields is about 5 to 6 cents only, exclusive of the rent of the land. Several farmers have fattened the last summer as many as 1500 hogs, and made most excellent pork. One and two hundred are considered an ordinary number. Hogs are usually killed at about 18 months old, and weigh from 200 to 300 lbs. It may be asked if this rich soil will not soon be exhausted. Large fields have been cultivated for 16 years, and yielded 50 bushels per acre. There is, however, a gradual diminution of the quantity, and hereafter the farmers will be *willing to save*

manure, which is now thrown away. I was surprised to find hundreds of loads carted at an expense of 12½ to 20 cents, and thrown into the river to get it out of the way.

The increase of the population and the agricultural produce of the Western States has been within these few years amazingly rapid. To judge of the situation and extent of these inland states, we here give an extract from the Report of the State of New York on the subject:

The western termination of the Erie canal looks out upon the Lake Erie, the more southerly and central of that great chain of navigable lakes which stretches far into the interior from our western boundary. Around these inland seas a cluster of five great states is rapidly rising. The territory which they comprise, and which is to become tributary to the canal, embraces that great area extending from the lakes on the north to the Ohio on the south, and from the western confines of this state to the upper Mississippi, containing 380,000 square miles. To measure its extent by well-known objects, it is fifteen times as large as that part of the state of New York west of the county of Oneida, nearly twice as large as the kingdom of France, and *about six times as extensive as the whole of England.* It contains 180,000,000 of acres of arable land, a large portion of which is of surprising fertility. This group of inland states has two outlets for its trade to the ocean, one by the Mississippi to the Gulf of Mexico, the other through Lake Erie and the navigable communications of the state of New York to the Atlantic. Whether it be attributable to similarity of origin, or laws, or habits, or the ties of consanguinity, or superior salubrity of climate, their people evidently prefer the market in the Atlantic, and are making prodigious efforts to reach it. Three great canals (one of them longer than the Erie canal), embracing in their aggregate length about one thousand miles, are to connect the Ohio with Lake Erie, while another deep and capacious channel, excavated for nearly 30 miles through solid rock, unites Lake Michigan with the navigable waters of the Illinois. In addition to these broad avenues of trade, they are constructing lines of railroads, not less than 1500 miles in extent, in order to reach with more ease and speed the lakes through which they seek a conveyance to a seaboard. The circumstance, moreover, is particularly important, that the public works of each of these great communities are arranged on a harmonious plan, each having a main line supported and enriched by lateral and tributary branches, thereby bringing the industry of their whole people into prompt and profitable action, while the systems themselves are again united on a grander scale, in a series of systems comprising an aggregate length of more than 2,500 miles, with Lake Erie as its common centre. Buffalo is the town situated at the termination of the navigation of the great lakes, and at the commencement of the Erie canal, leading to the Hudson, and thence to New York. Some idea may be formed of the commerce upon this line of route from the following facts:—There were received in 1835, in Buffalo, 86,233 bushels of flour, and

98,071 bushels of wheat, 14,579 bushels of corn, and 1,030,632 lbs. of butter. In 1846, 1,324,529 barrels of flour, 4,744,184 bushels of wheat, 1,455,258 bushels of corn, and 12,692,071 lbs. of butter. In 1836, the imports of the lakes were 2,324,248 dollars, exports 14,137,026 dollars. In 1841 the imports were 33,483,441 dollars, exports 32,432,581 dollars. In 1819 there was but one steamboat on the lakes; in 1845 there were upon the upper lakes 60 boats of 23,000 tons, some of them being of 1200 tons. The increase of shipping, both steam and sailing vessels, great as it is, does not keep pace with that of trade and population. In 1846 the tonnage was not sufficient to bring away the great storage of wheat of the Western States. It has been mentioned that the other outlet for the produce of the Western States is by the Mississippi to the Gulf of Mexico. Although not preferred by the majority of exporters, the increase of trade on this route has also been very great. In 1817 the steamboat navigation commenced; the whole tonnage, sailing boats, &c., was only 6,500 tons. In 1834 the steamboats had increased to 230, the tonnage being 39,000. In 1846 750 steamboats were estimated to be running, tonnage 160,000, estimated cost 12,000,000 dollars. Forty years before that date a single large steamboat would have taken all the produce of the western rivers to New Orleans. In addition to these steamboats there are from 4000 to 5000 flat boats, which float down the river carrying produce to New Orleans.

The increase of the population of the States producing such an immense amount of agricultural produce is also very striking. In 1800 the population of Ohio was 45,365, in 1846 1,760,000. In 1810 the population of Michigan was 4,762, in 1846 320,000. The population of Indiana in 1800 was 4,875, in 1846 860,000. Illinois had in 1810 a population of 12,282, in 1846 it had increased to 722,000. Wisconsin, the most recently formed Western State, and to which emigrants are flowing in great numbers, had in 1840 a population of 30,945, in 1846 it had increased to 100,000. The mind can scarcely grasp the almost inconceivable amount of agricultural produce which the Western States will create fifty years hence, if the increase goes on in the same ratio as in bypast years; and when, in addition to the energy and perseverance which characterise the present, and which will in all likelihood do that of the future population, they will have at their command the resources of improved arrangements, and the advantages of scientific knowledge as applied to agricultural pursuits.

As to the routine of operations which have been gone through in commencing farming in America on what is called unimproved or uncleared land we will now show.

Suppose a farmer has purchased 100 acres of land, he proceeds to the location in which it is situated, with his family in waggons, and provided with tents, &c., to house the family till the cabin or loghouse is built.

In the centre of the farm profound stillness reigns. Surrounded on all sides by heavy trees,

the farmer is at first sight apt to think that his chances of success are small. Having hired the services of an experienced woodman, who will have a sturdy tree cut down while another less experienced is looking where to begin the hewing—the first operation is cutting timber suitable for building. Having fixed on a site near a spring for the house, the operation of building is begun. To build a log cabin is a very simple matter.

Set posts in the ground (if yellow pine is selected it will last for many years) nine feet above the surface in the front and seven in the rear. Stout poles or split logs, flattened at the ends, placed horizontally, and one upon the other, should be spiked or pinned to these posts all round; the upper ones in the front and rear laid on the top of the posts, in which a notch should be cut to receive them, taking care that they are sufficiently stout to bear the roof, which is to be formed of poles laid one end in the front and the other in the rear of the building. These poles should be covered with inverted sod, then earth, and sod again, surface uppermost. The openings between the side poles or logs must be filled up with clay, and a snug, weather-tight cabin is at once made. A comfortable floor may be made of lime or clay and marl, taking care to have the ground on which the building stands a little rising. A chimney may be constructed in the usual way—that is, with logs and clay; or, if a stove is used, which is better, the pipe may go through the roof, giving the part which is exposed to the weather a coat of tar and sand, both inside and out.

The next operation is cutting timber for fences. For this purpose oak-trees that will split well are selected, and cut into lengths of eleven feet. When sufficient space is cleared for cultivation, the logs are piled up in heaps, the limbs and brush on the top. These piles are set fire to in the spring, and the land ploughed. This, as may be supposed, is a matter of some difficulty, from the number of the stumps. Ploughs may be broken, and shins too, in this work. The small roots are grubbed out, and the larger ones divided; to stop vegetation the outer bark should be taken off. Five or six acres may thus be prepared in the course of the winter by a man and boy. The first crop is Indian corn and potatoes; from forty to sixty bushels of corn per acre may be got. If the ground is in good order, the next crop may be wheat, the produce of which may be some fifteen or twenty bushels per acre. Care should be taken to leave sufficient woodland for fuel, and for a shelter for the cabin. A stock of provisions will have to be laid in for the first year, till the land becomes productive. The sum necessary to purchase stock and implements for a farm of 50 acres may be calculated at from 200 to 300 dollars; say, ploughs 6 dollars, harrows 5 dollars, waggon 50 dollars, other small implements 10 dollars, yoke of oxen 70 dollars, chains 5

dollars, two cows 30 dollars, twenty-five sheep 37 dollars. The cost of erecting a log cabin in the State of New York, 16 by 30 feet, board roof, two floors, windows and doors, and stone chimney, is called 30 dollars. The reason of this amazing cheapness is, that little, or, in fact, no money is laid out in wages, the neighbours invariably lending their assistance. The settlers around are invited on a certain day, the timber is cut, and the teams they bring with them are used to haul the logs to

the place where the house is to be built. The building is put up the same day, the logs hewn flat in the inside, the outside being left round, the chimney built up. All that the neighbours expect is their dinner, the settler finishing the remaining portion of the work himself, purchasing the "lumber"—as the planks, &c., are called in America—the cost of which is shown, as above stated, to be some 30 dollars.—*Journal of Agriculture.*

THE CONSTITUENTS OF WHEAT SOILS.

Whatever the mechanical constitution of wheat-soils may have to do with the *quality* of the sample of corn grown, there is no doubt whatever that the chemical constitution has much, if not all that is possible, to do with the *quantity*. We well know that soils known as the poorest—the coldest—the most tenacious, retentive, and stubborn, will grow, as regards quality, the very boldest and finest samples, though the amount of produce per acre may be very little; and it must also be admitted that, with certain restrictions, where the produce is large per acre, the sample is often inferior.

Still, as large quantities are the first object of the farmer, it is by no means uninteresting to inquire into the constitution of soils generally most favourable to quantity and quality; and these we shall find to be, in general, as regards mechanical constitution, the strong clay loams; and as regards the chemical constitution, the soils popularly known as alluvial deposits, and its similarly constituted congeners—the warp land adjoining tidal rivers. Now, the debris of which the former is mainly composed—the remains of animal and vegetable matter, the salts in a state of high solubility, and the particles in a state of fine comminution—all tend to form a pabulum as suitable, perhaps, for the wants of the infant plant as can be well conceived. Then the natural warp also is much of the same character, and its constituents are in so great a degree formed of the remains of the infusoria as to partake more of the character of animal manure itself than of the elements of a soil.

A very interesting paper, by Professor Anderson, appeared in the recent number of the "Transactions of the Highland and Agricultural Society of Scotland," in which he gives an analysis, not only comparative as to the elements of the different wheat-soils of Scotland, but also as to the degree of solubility in which these constituents are found; and though he is, like a scientific man, very careful of drawing too many deductions, yet still his paper is

a valuable contribution to science; for that the solubility of any given material in a soil has very much to do with the productive quality, is manifestly beyond all question. He thus takes two soils, which we have selected from a number—the one from Morayshire, a good red clover and wheat soil; and the other from the Carse of Gowrie, part of the valley of the Tay, and also a superior wheat-soil. The constituents of 100 parts are as given below:—

Carse of Gowrie. Morayshire.			
Silica.....	63.1954	....	80.2600
Peroxide of iron	4.8700	....	3.1210
Alumina	14.0400	....	6.0140
Lime.....	0.8300	....	0.9290
Magnesia	1.0200	....	0.5870
Potash	2.8001	....	2.4400
Soda	1.4392	....	1.3350
Sulphuric acid	0.0911	....	0.0410
Phosphoric acid	0.2400	....	0.0440
Carbonic acid	0.0500	....	0.1890
Chlorine	0.0098	....	0.0060
Organic matter	8.5508	....	3.4760
Water	2 7000	....	1.6090
	99.8364		100.0510

The striking points of difference here, are in the organic matter, in the phosphoric acid, in the potash, and in the soda. Silica and alumina we take as having more to do with the mechanical than the strictly chemical constitution of the soil. The Carse soil exceeds the Morayshire in phosphoric acid and organic matter, and the latter exceeds the former in its potash and soda. The precise character of the soils also, as regards nitrogen, are thus described:—Carse of Gowrie soil, 0.1428 nitrogen; Morayshire soil, 0.092 nitrogen. It is also equally superior in its carbon; viz., Carse of Gowrie soil, 2.5500 carbon; Morayshire soil, 1.455 carbon. Now, it hardly needed a chemist to say, that the one soil must be much superior generally to the other; but to complete the enquiry, the professor gives the relative solubility of the constituents—as we said before, a very material element in deciding on the agricultural value of the

components of a soil; and taking the whole of the constituents of the two soils named, we have the following results:—

	Carse of Gowrie.	Morayshire.
Soluble in water	0.1191	0.1672
Soluble in acids	9.2156	2.6478
Insoluble in acids.....	79.3200	92.250

We may possibly infer, that though the latter has more matter in a highly soluble state, and hence may for a time produce as much wheat as the former, still the former is a better wheat-soil naturally; will longer grow that crop, and with less damage; and will require less the sustaining influence of manure.

The amount of nitrogen is, beyond all question, one very important element in the appreciation of a wheat soil, at least in a chemical sense; and so far have some chemists and agricultural loving divines carried this theory, as to hold out that the supply of nitrogen alone will enable the soils to grow wheat *ad infinitum*. Nor need we hesitate to apply ammonia, sulphuric acid, and phosphoric acid, to soils already well supplied with the alkalies of potash, soda, and lime; for while the presence of the alkalies are doubtless necessary to a considerable extent, more especially while one will replace

or substitute for another, they require phosphoric acid, sulphuric acid, and, above all, free nitrogen to enable them to be available to the young plants. Hence the success of wheat on the warp, full of the organic remains of the infusoria, or the green sand also abundant in the same constituents; and to a very considerable extent the same may be applied to the deposits of rivers: the organic matter is abundant in phosphoric and sulphuric acids, and nitrogen in the form of ammonia; and these being so useful to the wheat plant, which more resembles animal matter than any other plant we know.

And we may be permitted to ask, have we not more power over the chemical alteration of soils, to make them capable of growing wheat, than we have over the mechanical? The latter we showed to be accomplished at a vast amount of labour, and hence of expense; the former is within the range of a small application, and at an expense comparatively trifling.

Once let a soil, mechanically favourable to wheat, be drained dry, and the chemical defects are within the limits of a very circumscribed range, and within the means of every farmer, however little soever he may know of chemical science.—Gardeners' and Farmers' Journal.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House, in Hanover square, on Wednesday, the 10th of July; present, Mr. Thos. Raymond Barker, V.P., in the chair; Hon. R. H. Clive, M.P.; Hon. G. C. Agar; Sir Thos. Dyke Acland, Bt., M.P.; Sir Montague Cholmeley, Bt.; Sir Robert Price, Bt., M.P.; Mr. Baines; Mr. Burke; Mr. Cail; Dr. Calvert; Mr. W. G. Cavendish, M.P.; Mr. Clavering; Mr. Layton Cooke; Mr. Dyer; Mr. Miles, M.P.; Mr. Milward; Mr. Ralph Neville; Mr. C. E. Overman; Mr. Parkins; Mr. Pendarves, M.P.; Mr. Chandos Pole; Mr. P. Pusey, M.P.; Prof. Sewell; Mr. Shaw, of London; General Shubrick; Prof. Simonds; and Mr. Spencer Stanhope.

Exeter Meeting.—The President transmitted a letter addressed to him by the Right Hon. Sir George Grey, her Majesty's principal Secretary of State for the Home Department, granting to the Society the Metropolitan Police Force required for "detective" purposes at the Exeter meeting.—Major le Bier offered, on the part of M. Le Mesurier, of Guernsey, to place his bull of the Guernsey breed (to be exhibited at the Exeter meeting) at the disposal of the Society.—Messrs. Lucombe, Pince, and Co., expressed their intention of throwing open to the members their nursery grounds at Exeter during the meeting. These communications were received with the thanks of the Council.

Distribution of Manure.—Mr. John Martin, K. L., of Lindsey House, Chelsea, transmitted to the Council

an interesting communication on the relative economy and advantages of the two systems of fluid and dry manure-distribution, which was received with thanks, and referred to the Journal Committee.

Drainage.—Mr. W. Bullock Webster transmitted a communication containing authentic documents connected with questions relating to deep and shallow drainage in strong clays; which was received with thanks, and referred to the Journal Committee.

Guano Adulteration.—Mr. Pusey, M.P., laid before the Council a statement of the increasing extent to which the adulteration of guano was taking place in London and other large towns along the coast. He also read to the Council a list of the unprincipled dealers, who were known to be connected with this nefarious system of plunder on the practical farmers of the country. Mr. Pusey, Mr. Miles M.P., the Hon. R. H. Clive, and Mr. Parkins, favoured the Council with suggestions for the exposure and suppression of these dishonest practices.

Cottages and Hollow Bricks.—Mr. Roberts, of Connaught-square, presented to the Council a set of Revised Designs for Dwellings in Agricultural Districts, lately published by the Society for Improving the Condition of the Labouring Classes, with a specification and tabular statement of the quantities of materials required in executing six of the designs, best adapted to the ordinary circumstances of labourers. He also submitted to the

Council a drawing and specimen of hollow bricks capable of being made with any good tile-machine, in the same manner as ordinary draining tiles, and at about the same cost, in proportion to the clay contained in them. He considered that the great advantages of dryness and warmth to be expected from the employment of hollow bricks, as well as of economy in construction, would render them peculiarly adapted for agricultural buildings, especially for farm-houses and labourers' dwellings, while their cheapness alone would recommend their use for enclosure and fence walls. He thought that all bricks prepared for these purposes should properly "bond" together and form substantial walls, without a medium being afforded for the conveyance of dampness from the exterior to the interior, in consequence of the heading courses and joints being carried through the wall. He considered also that the dimensions of the bricks ought to have reference to the convenience of manufacture and cartage, facility for the operations of the workmen, and economy of mortar. These presents and communications were received with the thanks of the Council.

Presents.—Mr. Willacy favoured the Council with further details of his employment of a hand-railway in his farming operations.—Mr. R. L. Allen, of New York, presented a copy of his "American Farm Book; or, Compendium of American Agriculture."—Mr. Davis presented a coloured print of Lord Vernon's oxen and sheep. These presents were received with thanks, and the Council adjourned.

A Special Council was held at the Guildhall, Exeter, on Thursday, the 16th of July: present, the Marquis of Downshire, President, in the chair; Earl of Chichester, Viscount Hill, Hon. R. H. Clive, M.P., Hon. Dudley Pelham, M.P., Hon. H. W. Wilson, Sir Thos. Dyke Acland, Bart., M.P., Sir M. W. Ridley, Bart., Sir Charles Lemon, Bart., M.P., Sir Robert Price, Bart., M.P., Col. Austin, Mr. Raymond Barker, Mr. Bramston, M.P., Mr. Brandreth, Mr. Hamond, Mr. Fisher Hobbs, Mr. Miles, M.P., Mr. Milward, Mr. Shaw, of London, Mr. Sillifant, Mr. C. Hampden Turner, Mr. Turner, of Barton, Mr. Jonas Webb, and Mr. Wilson, of Stowlangtoft. The Right Worshipful the Mayor was introduced to the Council by Sir Thomas Acland; and Mr. Brutton, the Honorary Secretary to the Local Committee, by Mr. Sillifant, the Chairman. The business of this Council was entirely confined to questions connected with the immediate proceedings of the County Meeting (toasts and speakers at the Pavilion dinner, admission of the representatives of the public press at the earliest hour into the show-yards, admission of the 140 Queen's scholars on Hele's foundation into the show-yards, questions on certificates of entry, and distribution of the duties of police).

The General Meeting of the Society was held in the Council Chamber of the Guildhall, Exeter, on Friday, the 19th July, the Marquis of Downshire, President, in the chair.

The following resolutions were passed unanimously:

1. Thanks to the Mayor and Corporation of Exeter, for their zealous co-operation and essential aid in promoting the success of the Country Meeting then held in that ancient and loyal city.—Moved by Col. Challoner, of Portnall Park, Surrey; seconded by the Hon. R. H. Clive, of Oakley Park, Salop, M.P.

2. Thanks to Mr. Sillifant, of Combe, the chairman, and to the members of the local committee, for the admirable manner in which they had so kindly attended, by anticipation, to all the wishes and wants of the Society in connexion with the progress and holding of the Exeter meeting.—Moved by Mr. Shaw, of London; seconded by Mr. Fowle, of Hursley.

3. Thanks to the owners and occupiers of sites of land, for the kind manner in which they had promoted the trials and exhibitions of the Society.—Moved by the Hon. Dudley Pelham, M.P., of St. Lawrence, Isle of Wight; seconded by Sir M. W. Ridley, Bart., of Blagdon, Northumberland.

4. Thanks to the committee of the Devon and Exeter Institution, for the liberal manner in which they had thrown open their museum and reading-room to the members of the Society.—Moved by Mr. C. Hampden Turner, of Rook's-nest, Surrey; seconded by Mr. Brandreth, of Houghton-house, Bedfordshire.

5. Thanks to the railway companies, for their concessions in favour of the exhibitors of the society.—Moved by Mr. Pendarves, M.P., of Truro, Cornwall; seconded by Mr. John Tanner Davy, of Rose-Ash, Devon.

6. Thanks to Prof. Simonds, for his kindness in delivering a valuable lecture before the members on the occasion of the Exeter meeting.—Moved by Mr. Barugh Almack, of Albion-street, Hyde Park, London; seconded by Mr. W. Barrow Simonds, of St. Cross, Winchester.

7. Thanks to Sir Thomas Dyke Acland, Bart., M.P., of Killerton Park, and Mr. George Turner, of Barton, for the kind and liberal manner in which they had submitted their respective Water and Catch Meadows to the inspection of the members of the Society, and for the interesting explanations they had offered to them of their theory and construction.—Moved by Col. Challoner; seconded by the Hon. R. H. Clive, M.P.

8. Thanks to the Marquis of Downshire, for the anxious attention he had given to the interests of the Society, and the able manner in which he had discharged the arduous duties of his office, in presiding over the various sittings connected with the business of the Society during the period of the Exeter meeting.—Moved by Col. Challoner; seconded by the Hon. H. W. Wilson, of Alexton Hall, Leicestershire.

Country Meeting.—The Hon. H. W. Wilson having inquired when it was considered that the Society's Meeting terminated, he was informed that the "General Meeting" at which he was then present, and which was held by direction of the Royal Charter, occupied only a short half-hour, and terminated on its rising at the expiration of that time; but that the "Country Meeting" of the Society, in its full, practical extent, was considered to engage an entire week—a period always referred to in the arrangements of the Society as the "Week of the Country Meeting."

A Special Council was held in the Council Chamber of the Guildhall, Exeter, on Friday, the 19th of July; present, the Hon. Robert Henry Clive, M.P., Trustee, in the Chair; Marquis of Downshire, Hon. Dudley Pelham, M.P., Hon. H. W. Wilson, Sir M. W. Ridley, Bart., Colonel Challoner, Mr. Shaw, of London, Professor Simonds, and Mr. C. Hampden Turner.

On the motion of the Marquis of Downshire, seconded by Mr. Shaw, of London, it was resolved unanimously, that the best thanks of the Council be conveyed to Mr. Brutton, of the Northernhay, Exeter, for the distinguished zeal and energy with which he had so kindly and efficiently promoted the objects of the Society in the dis-

charge of his duties as the honorary secretary to the Exeter local committee.

The Council directed a communication to be made to the authorities of Exeter expressive of their high approbation of the conduct of the police force under the direction of Superintendent Steele; and a similar one to the Commissioners of Metropolitan Police, in reference to the conduct of the force under the direction of Inspector May, of the A division.

Thanks were ordered to Messrs. Tuxford and Sons, of Boston, and to Messrs. Barrett, Exall, and Andrews, of Reading, for the kind manner in which they had so liberally placed their respective steam-engines at the disposal of the stewards, during the trials in the implement yard at Exeter, for sixteen hours on each of the four days on which they had been required.

The Council ordered their thanks to be conveyed to M. Le Mesurier for the kind intimation expressed to them on his part by Major le Bier, that the Society should dispose in any manner they thought proper of his Guernsey bull, shown at the Exeter meeting; at the same time, however, stating that their arrangements did not admit of their availing themselves of his liberal offer.

A Monthly Council was held in the Society's House, in Hanover-square, on Wednesday, the 7th of August; present, the Earl of Chichester, V.P., in the chair; Hon. Dudley Pelham, M.P.; Hon. H. W. Wilson; Sir Thomas Dyke Acland, Bart., M.P.; Mr. Raymond Barker; Mr. Barnett; Mr. S. Bennett; Mr. Burke; Mr. W. G. Cavendish, M.P.; Colonel Challoner; Mr. Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Kinder; Professor Sewell; Mr. Shaw, of London; Mr. Sillifant; Professor Simonds, Professor Way, and Mr. Jonas Webb.

Finances.—Colonel Challoner, Chairman of the Finance Committee, laid before the Council the report of that committee on the accounts of the Society; from which it appeared that the current cash balance in the hands of the bankers (including £390 received as life compositions, arrears of subscription paid up, and the special balance on the Exeter account), amounted to £3,422. Colonel Challoner also laid on the table, for the information of the members, the quarterly statements of receipt, expenditure, and liabilities of the Society.

Miscellaneous Communications.—Master Goodridge, of Hele's School, Exeter, returned the thanks of himself and his school-fellows for the gratification afforded them by the Council in the free admission given them to the show-yards of stock and implements at the Exeter meeting. Mr. Amos Bryant transmitted a communication on the cultivation of land. Mr. Graham reported his further researches into the origin and nature of the

potato disease. Mr. Moore, of Coleshill, reported the outbreak of disease among the Earl of Radnor's stock. The principal breeders of long-woolled sheep transmitted a memorial for the restoration of the Society's prizes in that class to their full amount. Prof. Way reported his conclusion of the investigation into the agricultural value of the Trinidad pitch-manure sent to the Society from the Earl of Dundonald, through the Right Hon. the Earl Grey. Notices of motion by the Hon. R. H. Clive, Mr. Shelley, Mr. Shaw, Col. Challoner, and Mr. Fisher Hobbs, in reference to questions connected with the Society's next country meeting. Letters from various parties on points connected with the Exeter exhibition. These communications were referred to the several departments to which they had reference.

On the motion of Mr. Raymond Barker, seconded by Mr. Jonas Webb, the usual vacations were granted to the secretary, and to the clerks of the Society, during the ensuing autumn recess. The Council then adjourned to Wednesday, the 6th of November.

The following new members have been elected since our last publication:—

Abergavenny, Earl of, Birling Manor, Maidstone, Kent
 Andover, Viscount, Suffolk House, Cheltenham
 Bacon, George P., Lewes, Sussex
 Baker, Rev. Robert, Compton-Basset, Wilts
 Barker, Edward, Mont-Vue House, Budleigh, Devon
 Barrow, John Monson, Stoberry, Wells, Somerset
 Booker, Richard Blackmore, Velindra House, Cardiff, Glam.
 Bolitho, E., Penzance, Cornwall
 Bolitho, T. S., Penzance, Cornwall
 Bragg, William, Moreton-Hampstead, Devon
 Brown, John, Tring, Hertfordshire
 Bush, George, Harley-place, Clifton, Bristol
 Camp, James, Ilfracombe, Devon
 Case, John Bolton, Poulton-Hey, Bebbington, Birkenhead
 Cornish, Rev. R. P., Countess-Weir, Exeter
 Froom, W. J., North-street, Exeter
 Fulford, Robert, Exeter
 Gilbert, John Davies, Trelissick, Truro, Cornwall
 Harmer, Fielding, South Cove, Wrentham, Suffolk
 Harris, James, Vivum, Barnstaple, Devon
 Hole, Henry, Ebberley House, Torrington, Devon
 Lushington, Charles Manners, Mansfield-street, Portland-place
 Milward, A., Keynsham, Somerset
 Newman, Richard William, 24, Soho-square, London
 Pasmore, James, High-street, Exeter
 Peel, William, Trenant-park, Looe, Cornwall
 Pickering, John, 14, Whitehall-place, London
 Plestow, Charles John Berners, Watlington-hall, Downham, Norfolk
 Ponsonby, Hon. C. F. Ashley Cooper, Hatherop Castle, Fairford, Gloucestershire
 Smith, H., Trefusis, Devonport
 Southcomb, Rev. Edmund, Rose-Ash, South-Molton, Devon
 Trench, Henry, Caugort-park, Roscrea, King's County
 Ward, John, East Mersea, Colchester, Essex
 Yelverton, Hon. Wm. Henry, Whitland Abbey, St. Clear's, Carmarthen.

NORTHUMBERLAND AGRICULTURAL SOCIETY'S SHOW.

LIST OF PRIZES.

CLASS I.—SHORT-HORNED CATTLE.

JUDGES.—Mr. A. Heriot, North Field, Aytoun, Berwickshire; Mr. J. C. Johnson, Chevet, Wakefield, Yorkshire; Mr. R. W. Saunders, Nunwick Hall, Penrith, Cumberland.

Best bull, not under three years old, £30, Mr. Anthony L. Maynard, Merton-le-Moor, Ripon; second, Mr. Thomas Crofton, Holywell, Durham.

Best bull, two years old, £10, Mr. G. D. Trotter, Bishop Middleham, Ferryhill, Durham; second, Mr. Philip Nairn, Warren House, Belford, £5.

Best bull, one year old, £10, Mr. Charles Towneley, Towneley Park, Burnley, Lancashire.

For the best of all the premium bulls £5, and a silver tankard given by Sir Matthew White Ridley, Bart., of Blagdon, Mr. Trotter, Bishop Middleham.

Best cow, £20, Mr. Thomas Crofton, Holywell, Durham; second, Mr. James Douglas, Athelstaneford, Drem, Haddington.

Best heifer, two years old, £7; second ditto £5, Mr. Benjamin Wilson, of Brawith, Thirsk, Yorkshire.

Best heifer, one year old, £5, Mr. Charles Towneley, Towneley Park, Burnley, Lancaster; second, £3, to same person.

Premium of £20, given by his Grace the Duke of Northumberland, for the best six short-horned cows and heifers, of any age, Mr. Thomas Wetherell, Kirkbridge, Darlington. 5 competitors.

CLASS II.—LEICESTER SHEEP.

JUDGES.—Mr. John Fawcus, South Charlton, Alnwick; Mr. Thomas Scott, Beal, Berwick-upon-Tweed; Mr. Marshall Stephenson, Fourstones, Haydon Bridge.

Best tup, of any age, £7, Mr. Thomas Dickenson, Magdalene Hall, St. Boswell's, Berwickshire; second, Mr. Thomas Brown, Snidlaw, Coldstream, £4.

Best shearing tup, first and second prizes of £7 and £4 to Mr. John Davidson, Brandon White House, Whittingham.

Best pen of five ewes, £5, Mr. John Davison, Brandon White House, Whittingham; second, Mr. John Lumsden, Moussen, Belford, £3.

Best pen of five gimmers, £5, Mr. Richard Marshall, Hetherslaw, Coldstream; second, the Rev. R. W. Bosanquet, Rock, Alnwick, £3.

CHEVIOT, SOUTHDOWN, AND BLACK-FACED SHEEP.

JUDGES.—Mr. William Aitchison, Linhope, Teviothead, Hawick; Mr. George Bolam, Ilderton, Wooler; Mr. James Davison, Tritlington, Morpeth.

CHEVIOT SHEEP.

Best tup, of any age, £5; second £3; Mr. Thomas Elliott, Hindhope, Jedburgh.

Best pen of two two-year-old tups, £5; second £3; Mr. Thomas Elliott, Hindhope, Jedburgh.

Best pen of two shearing tups, £5, Mr. Thomas Elliott, Hindhope, Jedburgh; second, Mr. John Dodd, Catcleugh, Otterburn, £3.

Best pen of five ewes, £5, Mr. Thomas Elliot, Hindhope, Jedburgh; second, Mr. John Thompson, The Frolick, Capheaton, £3.

Best pen of five gimmers, £5, Mr. John Dodd, Catcleugh, Otterburn; second, Mr. Thomas Elliot, Hindhope, Jedburgh, £3.

SOUTHDOWN SHEEP.

Best tup of any age, £5, Mr. Jonas Webb, Babraham, Cambridge; second, Mr. James Gray, Kimmerston Ford, £3.

Best shearing tup, £3, Mr. Thomas Wetherell, Kirkbridge, Darlington.

Best pen of five ewes, £3, Mr. A. Bell, Hope House, Amble.

BLACK-FACED SHEEP.

Best tup of any age, £3, and best pen of five ewes, £3, to Mr. Charles Summers, Park Head, Haydon Bridge.

HORSES, SWINE, AND EXTRA STOCK.

JUDGES.—Mr. John Charles Langlands, Bewick, Alnwick; Mr. Edward Mole, Newton Barns, Alnwick; Mr. Joseph Robson, Backfield House, Gateshead.

CLASS III.—HORSES.

Best brood mare for agricultural purposes, £5, Mr. James Scott, High House, Alnwick; second, Mr. Thomas Brown, Snidlaw, Coldstream, £3.

Best two-year-old colt for agricultural purposes, £3, to Mr.

William Turnbull, Detchant, Belford; second, Mr. John Taylor, Preston, Coldstream, £2.

Best two-year-old filly for agricultural purposes, £3, Mr. William Turnbull, Detchant, Belford; second, Mr. Bryan Burrell, Broome Park, Whittingham, £2.

Best one-year-old colt for agricultural purposes, £2, Mr. W. Drysdale, Lorbottle, Whittingham; second, Mr. W. Appleby, Eastfield, Warkworth, £1.

Best one-year-old filly for agricultural purposes, £2, Mr. George Dodds, North Lyham, Wooler; second, Mr. Michael Davison, Longbank, Alnwick, £1.

Best brood mare for the field, £5, Mr. Thomas Forster, Scrainwood, Rothbury.

Best three-year-old colt or filly for the field, £3, Mr. Thomas Crisp, Hawkhill, Alnwick.

Best brood mare for harness, £5, Mr. Joseph Snowball, Netherwitton, Morpeth.

CLASS IV.—SWINE.

Best boar of the long-eared breed, £3, Mr. John Dinning, Adderstone, Belford.

Best boar of the short-eared breed, £3, Rev. George R. Bigge, Linden, Morpeth.

Best sow of the long-eared breed, £3, Messrs. Atkinson, Seaham Hall Farm, Seaham Harbour.

Best sow of the short-eared breed, £3, Mr. Henry Atkinson, Greensfield Moor, Alnwick.

WOOL.

JUDGES.—Mr. J. Brown, Alnwick; Mr. Jeremiah Clough, Leeds; and Mr. T. Humble, Jesmond, Newcastle.

Best ten fleeces of Leicester wool, £3, Messrs. Pringle, Snitter, Rothbury.

Best ten fleeces of Cheviot wool, £3, Mr. Robert Donkin, Ingram, Whittingham.

CLASS V.—EXTRA STOCK.

CATTLE.—Mr. Benjamin Wilson, Brawith, Thirsk, Yorkshire, a pair of two-year-old twin short-horn heifers, £2. His Grace the Duke of Northumberland, Stanwick Park, a three years and eight months old steer, £1. The Right Honourable Earl Grey, Howick, Alnwick, a four years old steer, bred by Mr. Reed, of Warkworth Barns, £1.

SHEEP.—Mr. W. T. Straker, Chibburn, Widdrington, Morpeth, a shearing South Down tup, £1. Mr. John Lumsden, Moussen, Belford, an aged Leicester tup, £1. Mr. Robert Dand, Field House, Alnwick, a pen of lambs by a Shropshire Down tup out of a Cheviot ewe, £2.

IMPLEMENTS, SEEDS, AND ROOTS.

JUDGES.—Mr. George Dunn, Ellingham, Belford; Mr. Middleton H. Dand, Hauxley Cottage, Amble; Mr. John Thompson, Pawston, Coldstream.

SEEDS AND ROOTS.

Messrs. Hogg and Wood, Coldstream (seedsmen to the society), for their excellent variety of seeds, roots, &c., £5.

IMPLEMENTS.

Mr. Jonas Crewther, Tweedmouth, a draining pipe tile machine, £3; Messrs. C. D. Young and Co., North Bridge, Edinburgh, a strong and economical set of stack pillars, £5; Mr. William Scott, Bolam West House, Belsay, Morpeth, a swing plough with coulter cleaner, £1; Messrs. William and Thomas Reay, Ponteland, Newcastle-upon-Tyne, a plough invented by Mr. Laycock, £1; Messrs. Wilkin and Dickman, Alnwick, the Northumberland corn drill, £6; Mr. Gibson, Newcastle-upon-Tyne, Gibson's improved clod crusher, £5; Mr. Joseph Jobling, Coldstream, two single horse Scotch carts, fast bodied, £2; Mr. George Briggs, Wooler, an improved cup turnip drill, for sowing hilly as well as flat land, £2; Mr. Hall, Alnwick, for a machine for making large pipes, £3; Mr. Thomas Carss, Guynance, for his improved swing plough, £2.

PEAT CHARCOAL AN IMMEDIATE DEODORISER AND VALUABLE MANURE.

Several noblemen and gentlemen deeply interested in the question of sanitary reform, by which the health and condition of the poor in our cities and towns may be improved, and who are equally interested in ameliorating and giving employment to the Irish peasantry, and in the development of the vast resources of Ireland, met on Saturday the 3rd August, at the house of W. Pinney, Esq., M.P., Berkeley-square. The particular object of the meeting was to hear a detailed account by Jasper Rogers, Esq., Directing Engineer of the Irish Amelioration Society, who was called on to prove by facts the theories he has propounded for the last three years, and to test which the Irish Amelioration Society was formed. The most important of these facts, amongst many of minor consideration brought forward by Mr. Rogers, was, that by a very simple means all the filth that now passes through our sewers, poisoning the waters of our rivers by its deposits, and the air by the exhalation of its gases—spreading widely, as well as originating, the most fearful epidemic and zymotic diseases—by which the poverty and misery of the labouring classes are increased, and the lives of their families unnecessarily sacrificed—could be arrested in its progress either to or through the sewers; and by its admixture with peat charcoal, this, the most obnoxious and pestilent filth, might be converted into a very cheap and portable, but highly valuable, manure.

Considerations of equal magnitude and importance, as regards the amelioration of the condition of the Irish peasantry, were connected with these plans: for the conversion of the peat bogs of Ireland into charcoal for sanitary purposes would give employment to many thousands of the Irish peasantry (the only and true means of ameliorating their condition), and lands now wild and dreary wastes would be reclaimed, and rendered amongst the most fertile of that naturally rich, but most unfortunate, country. That this, as regards the improvement of the Irish peasantry, is not a mere visionary scheme, is proved by the success that has hitherto attended the labours of the Irish Amelioration Society, which will be found detailed in Mr. Pinney's able speech, and afterwards in Mr. Rogers' lecture. The results are highly satisfactory, for this society have solved three important problems: first, that the Irish peasantry, if fairly treated, and under firm but judicious management, rank amongst the best and most industrious and honest labourers in the world; secondly, that the peat of which the bogs of Ireland consist, hitherto an incubus to the country, may be converted into a profitable article of commerce; and lastly, that capital can be safely invested in Ireland, and in this and other speculations return profits equal to, if not surpassing, what can be obtained from any other investment.

The Irish Amelioration Society, who have been working quietly for the last three years, are the pioneers in this great work, and the important results they have obtained, and the facts which they have established, excite the strongest hopes that the miseries which afflict Ireland will soon pass away, and the recurrence of evil be prevented.

Notwithstanding the meeting took place on Saturday, a day on which few members of parliament stay in London, and the House of Commons sat in the morning,

yet very many influential members attended, especially the representatives of Ireland. There were also present several scientific men and gentlemen, who took a deep interest in the objects of the meeting.

Mr. PINNEY, who was warmly greeted, rose and said, "My lords and gentlemen, the noble chairman of the Irish Amelioration Society has requested me, his deputy, to preside on this occasion. Why he has done so, I cannot say, unless, perhaps, he imagines that in consequence of his late absence on the continent he is not so well acquainted with the operations and the actual condition of the society as I, from my having been constantly in communication with the practical and working officers of the society, and from having been generally present at the recent meetings of the court of directors (Hear, hear). But I assure the noble lord that he would more efficiently discharge the duties of chairman than I possibly can; and therefore I much regret his hesitating to take his legitimate post on the present occasion, but trust that he will yet yield to the unanimous wish of this meeting by presiding over it (Hear, hear). I have collected a few statements which I am anxious to lay before the meeting this day, in doing which I would be greatly assisted if his lordship took the chair (Hear, hear)."

SEVERAL VOICES: Do, my lord, take the chair.

LORD DE MAULEY:—I assure my honourable friend, and you, my lords and gentlemen, that it is not from a lukewarmness as regards the society, for whose prosperity, and ultimate success I am most deeply anxious, that I hesitate taking the chair this day (Hear, hear). I am solely induced to impose the duty on my honourable friend because I, who have been some time absent from this country, cannot be so well acquainted with the actual position of the society's affairs, as he who was never absent, who has anxiously watched its progress (Hear, hear). Still, my lords and gentlemen, if it is your desire, I will waive all objection, and take the chair on this very interesting and important occasion (cheers).

Mr. PINNEY: Before I submit to the meeting the statements which I have collected respecting the properties and uses of peat charcoal, it may be well to make a few preliminary observations concerning the origin and the objects of the Irish Amelioration Society (Hear, hear). The society has been established some time, and on the 26th of January, 1849, was incorporated by royal charter. Its chief, and indeed its paramount object, is, to give to the Irish people, and the Irish peasantry especially, remunerative employment—(Hear, hear)—calculated to create amongst them habits of industry, by making them feel that their industry will be amply remunerated. Like all other societies, ours had many difficulties to encounter, which have been to a great degree, if not altogether, surmounted (Hear, hear). We have no connexion with other societies whose objects are generally multifarious. The sole and only object of this society is to make peat charcoal, and to render it available for the purposes for which the society intends it. If those purposes be attained, and if the peat and peat charcoal be sold at a fair, not an enormous profit a great good will be effected, by giving employment to the Irish people. Some prejudices against the Irish people prevail amongst the English, many of whom imagine that the Irish will not work so well in

their own country as they do elsewhere: but we have from the superintendent of the works the most satisfactory statements to the contrary; which proves that the Irish are as industrious at home as abroad, and that if they are paid even moderate or low wages, that they are as anxious as any other people to be industrious, and to perform the most laborious work (Hear, hear). In every instance the superintendents laud the industry, the gratitude, and the anxiety of the peasantry, including women and children, to get employment. The intelligence on this head, from the society's establishment at Derrymullen, is most gratifying and most encouraging; indeed, wherever we commenced working, the Irish peasantry bear the same character for industry, attachment to their employers, and peaceable conduct (Hear, hear). I will read, before I conclude, one communication respecting the Irish peasantry employed on our works, which will give you some idea of their real character, and will no doubt disabuse your minds of any prejudice you may entertain against them:—At Derrymullen, near Robertstown, Kildare, we established a station. The moment the poor peasantry heard of our arrival and intentions they crowded around us, imploring of us to give them work. I wish that certain parties, who should feel a deep interest in Ireland, but who are as willing as strangers to create a prejudice against their own countrymen, had witnessed the scene. I, however, sincerely trust that in time we will also have those gentlemen co-operating with and assisting us in executing our objects. The grand aim of this meeting is to make the Irish members acquainted with what we have done, what we are doing, and what are the fruits of our exertions. (Hear, hear.) Well, then, the fruits of our labours are to be seen, to a partial degree, in Robertstown, where are employed three hundred men, women, and children, who rapturously hailed our arrival, pledged their word to work honestly and laboriously, and who have honestly kept their promises, and have placed the utmost reliance on our good feelings towards them. (Hear, hear.) The Society's superintendent, at Robertstown writes thus:—“The peasantry, on hearing that they would be remunerated according to their exertions, have set themselves to work in earnest, commencing their labours throughout the summer at four o'clock in the morning, and continuing to work the entire day—half day, in a state of seminudity, and barefooted—on the wet bog, until eight o'clock in the evening. The work of amelioration has commenced, although on a small scale, for several of the men employed have appropriated the proceeds of their severe labour to clothing themselves and their families; whilst others, to my personal knowledge, have purchased pigs, and cultivated their lands, which before lay waste for want of money to buy seed; and many of the workmen have told me that all they want to render them happy is employment.” (Applause.) I am not aware whether the properties of peat charcoal, when mixed with night-soil as a manure, are generally known. They were tested a short time since, before two meetings. One experiment was made at the Mechanics' Institute in the presence of between 600 and 800 persons. On that occasion a large quantity of offensive matter was brought forward—we shall not now repeat the experiment (laughter)—and mixed with the prepared peat charcoal in a large machine. Immediately afterwards, the combined matter was shovelled or spouted out, in a dry state, and deposited in bags, without giving the slightest offensive smell. This shows that it can be carried anywhere, in a dry in-offensive state. Some of the spectators took away a portion of it in their pockets. In Dublin a similar trial, with equal satisfaction, was made. Another trial of its properties was made before Lord Lyttelton and the Rev. Mr. Girdlestone, which exhibited a most remarkable

feature in the properties of peat charcoal. Several chemical compounds, prepared by Sir W. Burnett and Mr. Ellerman, to disinfect or deodorize feculent matter, were tested, and were proved much inferior to the peat charcoal, for it not only deodorized the feculent manure, but positively deodorized the other compounds recommended by Sir W. Burnett and Mr. Ellerman, freeing those very compounds from the offensive smell which they had imbibed in their action on the manure, or had originally possessed. (Hear, hear.) But it may be said, Now that you have got your manure, what will you do with it? I am gratified in being enabled to inform you that it has proved itself to be a powerful agent in arresting and preventing the potato blight. This has been evidenced by gentlemen of high standing and the most consummate experience, who state that where, in the first instance, they manured the land for potatoes with peat charcoal manure, and the planting took place early in the season, they altogether escaped the disease; while upon the application of the manure to beds that were diseased, the blight gradually and totally disappeared. (Hear, hear.) I shall now, in proof of these statements, read a few extracts from letters on this subject which appeared in the *Farmer's Magazine*, and from others directed to our secretary and Mr. Rogers:—

Mr. Russell, of Dunlewey House, County Donegal, commenced his experiments in 1846. He tried peat charcoal with almost all the usual farm produce, with uniform success, and as a top dressing for grass land, he has fully borne out all Mr. Rogers stated in that respect; but his trial on a field of four acres of potatoes in 1847, was very remarkable. They were planted in ridges, or as termed here, “lazy beds;” one half of the field manured with farm-yard manure, the other with peat charcoal only, about a handful thrown on each seed. The result was more than a double crop from the charcoal; and he informed Mr. Rogers, that he was himself so astonished at the fact that he requested Lord Donegal to see and vouch it. At the suggestion of Mr. Rogers he planted oats the next year on the whole field without any further manure, and he found the increase on that portion was nearly in the same ratio as the potatoes.

In February last Mr. Newton, of Mount Linster, County Carlow, planted a large field in drills, manured as usual, not then having charcoal; but in April he got some, and before the potatoes being earthed, he top-dressed a few yards at the foot of all the drills as far as he had charcoal. He states that the result was not only very nearly a double crop, but there was not a taint in one of them, while all the rest of the field was more or less diseased. He also states that he has now a crop of Swede turnips that cannot be exceeded, yet they were not sown till June. No rain came for a month after, all the crops in his neighbourhood failed, and his were only manured with peat charcoal. In short, he has fully proved its value for all plants; he excepts nothing. In reply to an inquiry as to its value for grass land, he states—“Nothing can exceed it, and there is little or no labour in using it. My friend Feunick swears by it, and declares he will write his name on the best grass in the country with black charcoal, and it will be the greenest part of the field in ten days.”

I shall next read a letter from Mr. Burnell to Mr. Andrews, on peat charcoal—

“SIR,—I have the pleasure to send you a specimen of the peat charcoal prepared with night soil, and regret very much that you should have had occasion to remind me of my promise. You should have received it long since could I have found a safe channel for its delivery.

“The cesspool upon which I tried it contained, as nearly as I can guess, about four tons of the most fetid matter, and exhaled an odour teeming with pestilence. This I immediately obviated by causing half a sack of charcoal to be thrown over the surface and around the festering sides of the brick tank, greatly to the surprise of the rustic operators. In the course of a day or two I proceeded to empty the cesspool; but having only 10 cwt. of charcoal, I was desirous that the quantity should be made available to the disinfection of the entire mass of night soil, and only employed enough to take off the most

vicious part of the smell at the moment. For this purpose, I took care in the process that the surface of the night soil should always be covered with a stratum of the dry charcoal, and as a portion of that was removed with a ladleful of soil, its place was supplied with fresh charcoal, while the contents of each ladle were thrown into a large butt, and well stirred up, with the addition of a little more of the 'Doctor.' I had two butts, which, when full, I covered with about an inch of charcoal, and left about 18 hours, when they were emptied into the corner of a dry building, and the little offensive smell remaining removed by throwing over the heap a few shovelful of dry charcoal. This operation was repeated until the cesspool was emptied, and about 9½ cwt. employed. The remaining half cwt. I used to keep all safe and free from exhalation. In a fortnight I caused the mass to be well mixed by cutting straight from top to bottom, when it was perfectly free from any trace of its origin. A great deal of this I have employed upon my grass, a portion of which was manured with a compost of lime, rubbish, and vegetable mould from the adjoining ditch bottoms. The crop of hay upon the charcoaled part was at least one-third better than the remainder.

"The turf of which I formed my lawn was from an old meadow for many years without manure; this now, with a pretty free sprinkling of the prepared charcoal, will rival many of the old-established and carefully-kept grass plots.

"Early in February I planted early York cabbages; the 100 with charcoal have been all cut, whilst those planted in the ordinary way are still unfit for use.

"Upon the potato its use is evidenced by the vigour and much deeper green of the haulm; it is at present too early to pronounce upon its efficacy in respect to the tuber.

"In March I planted strawberries, and despite the severe frosts and subsequent dry weather those which have charcoal produce a little ripe fruit, whilst the rest are barren. Its beneficial effects upon the peas and beans are also denoted by the increased strength and deeper green of the straw, with a corresponding augmentation of produce.

"I would not omit either to tell you how much gratified I am at the results perceptible upon the flower-borders, in the brilliancy of the scarlet geraniums and the intense pink of the roses, and among the annuals the beautiful blues of the *Convolvulus minor* and *Nemophilla insignis* are as much deepened as the flower is increased in size. The mignonette, French poppy, larkspur, and lavatera, are all in their way rendered more attractive; and I much wish that you could, as I am at this moment, be enjoying their delicious odour, and the sight of their bright and lovely colours—a pleasure I would ensure to you, would you fulfil the promise you made me of paying me a visit.—I remain, yours very faithfully,

"Stuartell Moor, July 3." "THOS. BURNELL.

Now (resumed Mr. Pinney) as all crops require a certain portion of moisture, and as peat charcoal absorbs eighty per cent. of atmospheric moisture, it is admirably calculated to impart the required moisture to the crops, and therefore as a manure it is vastly superior to guano. The specimens of flowers produced here this day by Mr. Cuthill, and the statements of Mr. Burnell, who says that he spread the peat charcoal manure over lawns and around flowers and geraniums with the greatest effect as regards their luxuriance, beauty, and colour, are irrefragable evidences of the extraordinary powers which it possesses. The only other statements with which I will trouble you are those of Dr. Ulick Burke, Sir Robert Kane, and Mr. Stanley, who are connected with the Irish poor-law unions, and who witnessed the effects of the deodorizing qualities of the peat charcoal at three union workhouses. Dr. Ulick Burke, in a letter addressed to the Poor-law Commissioners, dated Swinford, county Mayo, Nov. 21, 1849, writes—

Gentlemen: Having been called on to attend a meeting of the Board of Health, held at the Workhouse, on the 3rd of May, I was at once struck with the intolerable and sickening effluvia which, arising from the sewers, cesspools, and privies, pervaded every part of the establishment; and which with the chlorine, which was being evolved in every direction for the purpose of correcting it, formed a compound of villainous smells which no stomach, but one accustomed to it, could for a moment tolerate. Your very active and efficient inspector,

Captain Hanley, told me that he had done everything that could be thought of, and spared no expense to try and have the nuisance abated, but that all his exertions were useless. I then begged him to send down and purchase a few loads of peat charcoal, which were selling at the market; and having told the master how to employ it, the suggestion was at once adopted, and though the material was not of the best description, nor "recently prepared," in a very few hours the most delicate and practised nose could not have detected the slightest offensive odour.

Since then the master, with very praiseworthy attention, has had a large pit of the charcoal prepared every week, and by its occasional use through the grating of the sewers, and by sprinkling it over the night-soil in the privies, the workhouse is, as far as entire freedom from every noxious and offensive effluvia, a model to every other in the kingdom.

In every respect the results have been most satisfactory. Instead of paying from five to ten pounds every half year for having the privies cleansed, and having itself and the whole surrounding neighbourhood at the same time poisoned for weeks by the intolerable stench, the establishment has that task now performed by the paupers without the slightest reluctance on their part; and the contents of the sewers, cess-pools, and privies are now collected into inodorous and innoxious heaps, or mixed with the other refuse of the workhouse until removed by the contractor, which before he absolutely refused doing, but which he now considers the most valuable portion of what he contracted for.

But the effects on the health of the inmates of the workhouse are far more satisfactory. I find that the numbers registered during the half-year ending 25th March last were 3,535; of these 132 (or one 26 11-13ths) died during that period. In the half-year ending 29th September last the numbers are respectively 4,262 and 68, or a mortality of one in 62 23-24ths; and of these 68, 23 died between the 25th March and 4th of May—a period of little more than five weeks, before the charcoal was employed; while during the last four weeks in which I had the temporary charge of the Infirmary and Fever Hospital, but three deaths have occurred; one from phthisis, one from variola, and the third, a poor bed-ridden idiot, from chronic disease of the bowels. Giving the utmost credit to all the officers of the establishment for the extreme cleanliness and order which prevails throughout, the difference in the mortality of the two periods is so striking, and even startling, that I feel I am not assuming too much in attributing it principally to the improved and healthy state in which the atmosphere is maintained. It must also be recollected that the latter was the period during which cholera was so prevalent, and, though some rapidly fatal cases occurred in the town and neighbourhood, not a single one presented itself in the workhouse, where it was most likely and most dreaded to prevail.

From the abundance and consequent cheapness of the raw material, from the facile and inexpensive process of its manufacture, from the lightness which renders it easily portable, and from the small quantity necessary to produce a great amount of benefit, peat-charcoal is calculated to become the greatest boon, both as to comfort and health, that has ever been offered to the inhabitants of cities and large towns. Its introduction into general use would give the much-desired employment to thousands of our destitute and laborious, but at present unemployed poor, and tend at the same time to ameliorate our too humid climate by the drainage of those dreary wastes which now disfigure the whole face of the country.

Absorbing and retaining, in spite of all atmospheric influences, the ammoniacal, sulphuretted hydrogen, and other gases, the exhalation of which render the proximity of night-soil so injurious to the health; but yielding them easily and gradually to the spongioles of the roots of the cereal and other crops (of which they are the best aliment), the mixture of charcoal and night-soil presents the farmer with a manure whose value cannot be too highly estimated—in my opinion, more than double in value to an equal weight of guano in fertilizing properties, and equally portable. But this is a subject on which I feel myself incompetent to speak as it deserves, and merely stating the general fact, I leave the investigation to those to whom it more properly belongs.

I hope that it will not be for a moment supposed that I

claim the slightest portion of the merit of the discovery of these valuable properties in peat charcoal. The power which prepared charcoal has of absorbing gases, and disinfecting meat and water when tainted, has been long known to the merest tyros in science and in the culinary world; but I believe that Mr. Jasper W. Rogers is entitled to the merit of the discovery of the truly valuable properties of *peat charcoal*, and I cannot help wishing him all the success he so richly deserves. The only merit I can have any claim to, is the very subordinate one of being, I believe, the first to introduce it into a public establishment in this country, and verifying the accuracy of the discovery by a six months' trial.

Apologizing for the length to which this communication has run, permit me to express the assurance of the very great respect with which I have the honour to be, gentlemen, your obedient servant,

ULIC BURKE.

Swinford, Mayo, November 21st, 1849.

Sir Robert Kane and Mr. Stanley (continued Mr. Pinney) fully corroborate every statement made by Dr. Burke, and put beyond the shadow of doubt the deodorising qualities, as well as the profitable character of the peat charcoal (Hear, hear). I have therefore the greatest desire that the peat charcoal should be used as a sanitary medium, and applied as such to the health of towns. I have, my lords and gentlemen, put before you these few statements, the result of actual experience, and not the fancies of theory or of a ruinous speculator (Hear, hear). We seek not self-aggrandisement or personal gain in our project. No: our first and our last object is to give hope to a country sunk in despair—to raise up and improve a peasantry now struck down and degraded, and thereby impart confidence, happiness, and security of life and property to the sister isle; an isle to which we are united by the strongest bonds of mutual interests, affection, and friendship that can bind two countries together (Hear, hear, and applause).

The noble CHAIRMAN expressed the great gratification which the lucid statements of the honourable and eloquent member who just sat down afforded him; and then his lordship called upon Mr. Jasper Rogers to favour the meeting with his views as to the application of charcoal for sanitary purposes, and the results of his personal inspection and superintendence of the society's works in Ireland.

MR. ROGERS: My Lords and Gentlemen—At the request of Mr. Pinney, I come forward to explain the nature, the present condition, and the future prospects of the great undertaking into which this society has embarked. But I fear very much indeed, that I shall fail in making the objects and operations of the society understood to that extent which is desirable, and which the nature of the subject demands. If we could see, and properly understand, the advantages that would arise from countenancing and supporting in a liberal and extensive view the opportunity that now presents itself for improving Ireland, and of conferring benefits on both countries, through the medium of this society, there are perhaps few hands or hearts amongst us that would not willingly aid and sustain it. (Hear, hear). The advantages which this society is endeavouring to secure to both countries cannot by possibility be overrated. I fear that I shall be guilty of omissions in my exposition this day; but I have felt it to be my duty to comply with the request of Mr. Pinney, who so kindly, disinterestedly, and ably advocated the objects of this society; perhaps not so much of the society as of the unfortunate people whose condition this society is endeavouring to ameliorate and improve. (Hear, hear). I must, my lords and gentlemen, under these circumstances, pray your kind indulgence. But, although I am diffident of my own capabilities, I have such confidence in the measure itself, that I fearlessly challenge the most jealous-searching investigation; and I shall be happy to answer unhesitatingly any and every question

that may be put to me. (Hear, hear). In the first instance, allow me to draw your attention to the nature and formation of the Irish bogs. In that diagram (pointing to one of the sections) you will see a section of two parts of the bog of Allon, which are about 30 or 40 feet deep. You will perceive that the low part has a blue-and-white colour—that is the substratum, composed of gravel and marl; next is the turf, almost black, which, as usual, almost approaches a coal. The strata over it presents a different appearance—a deep brown colour. From it and that above it we make “Sanitary Charcoal,” also for a manure individually, and for other purposes. There is a remarkable fact connected with that portion of bog—the roots and knots of three strata of trees grow upwards, showing that they had been produced and swept away at three different periods, under apparently similar circumstances. This is not usually the case: generally the trees, of which a great number are found lying horizontally, are discovered at a depth of 20 or 30 feet, whilst the bog itself is frequently 50 feet or more. Ireland contains nearly 3,000,000 acres of bog, which, if properly worked and manufactured into charcoal, after answering the wants of Ireland, might supply London with 2,000,000 tons of charcoal yearly, the other towns in proportion. And yet, if examined into, it will be found that the whole consumption would not get rid of the peat bogs of Ireland in less than about 6,000 years (Hear, hear, hear, and a laugh). This opposite diagram describes the method of drainage as applied, under my patent, to bogs. The drains are formed in terraces or steps, one over the other. When a number of them, say 200 or 300 yards apart, are cut, the weight of the superincumbent parts, and of the whole body, presses down the mass and forces out the water. Thus we are enabled to cut the peat, after a given time, in nearly a dry state. The turf, while this percolation takes place, will become drier and drier every year, and consequently fitter for burning without much cost, which is one of the causes that shall enable us to sell the peat charcoal in London at so low a rate; our object being not *high*, but *fairly-remunerative* prices. After the turf, so dried by drainage, is cut, it is carried into the drying house, where it is further dried, by the heat which the charcoal itself whilst burning gives out. Thus the drying is accomplished by the heat from the furnaces, the caloric from *one* of which is sufficient to dry nearly five times the volume that the furnace contains. Permit me now to show you samples of this peat and charcoal produce. These large lumps are in appearance as when cut by the people, after the fashion of the country. Next is the *cinder*, which is very desirable for culinary purposes, and is free from those gases which, from the abundance of pyroligneous acid existing in wood, makes wood charcoal so distressing to the head, and this charcoal has no odour. Here is another sample, and which is equal to any charcoal, even to that species of charcoal for which pyrotechnists pay £5 or £6 a ton, and to other charcoal which is dearer.

MR. WAKLEY, M.P.: Of what charcoal do you speak?

MR. ROGERS: “*Animal charcoal*,” made from bones, which sells for at least £9.

MR. WAKLEY: Is the peat as good as the animal charcoal?

MR. ROGERS: Yes, and perhaps possesses properties above animal charcoal. This description of charcoal is also very desirable for use in foundries, as several trials have proved. It is used for furnishing the moulds, and in London the price is now £8 to £9 per ton. Having brought the value of peat charcoal under the consideration of King's College, and also in Dublin, this description of charcoal has been used in hospitals and sick chambers, and for several medical purposes, with the

most astonishing effect. Several medical men have used it in poultices and for foul wounds; and it has not only destroyed the odour from offensive discharges, but also has aided wonderfully in healing the wounds. It is also an extraordinary corrector of foul breath. Professor Ferguson, King's College Hospital, has made several experiments with it, and has practically proved that when all other deodorizers failed, peat charcoal purified the wards and the privies of the hospital, and that it is also an efficient healing agent when mixed with poultices.

Major-General McLEOD rose and said: Here is a letter from Dr. Ferguson to me on the subject, which I beg Mr. Rogers to read (Hear, hear).

Mr. Rogers accordingly read the subjoined letter:—

16, George-street, Hanover-square, Aug. 2, 1870.

MY DEAR SIR,—I am so engaged that I cannot attend your meeting to-morrow, but I wish the object of it every success.

Having had the opportunity of appreciating the deodorizing effects of the peat charcoal, as prepared by Mr. Rogers, I can bear testimony to its wonderful influence; and since I witnessed these experiments I have had the additional opportunity of testing the powers of this material in my own professional avocations. I have used it extensively as a deodorizer in the wards of King's College Hospital, and invariably with excellent results. In particular I may mention two examples in which it proved of great service. In these cases the bowels discharged their contents through unnatural apertures in front—in the groins. In such instances hitherto it has been almost impossible to keep patients in any degree of comfort—the offensive smell causing the utmost annoyance to themselves and those around; such happened in one of these instances, when I thought of mixing the powdered peat charcoal with the luscated poultice, which was constantly in requisition. The effect was in a measure perfect; there was no longer that offensive stench so familiar in such cases. The other instance was treated in a similar way with like effect. In sloughing sores, and in certain forms of open cancer (in which cases the smell is usually very bad), I have been equally well pleased. In short, I may say that I have this preparation in almost constant use, and it possesses this advantage over many others intended to produce similar effects, that there is no unpleasant or questionable odour in itself.

It is but right to mention that ordinary charcoal has been used occasionally in many parts of the world, partly with the objects above referred to, but I do not think that the attention of the profession has been much drawn to the subject. However largely it might be used by the profession for the purposes alluded to, I fear that no great profit could be anticipated from the necessarily limited demand; yet as one out of the many excellent qualities of this material this feature should not be overlooked.

If these statements can be of any use to you to-morrow, or at any other time, I have much satisfaction in placing them at your disposal. I am, my dear sir, always faithfully yours,

WM. FERGUSON, F. R. S., Professor of Surgery in King's College, &c.

To General McLeod.

Mr. ROGERS having read Professor Ferguson's letter, continued: I have made every possible experiment to satisfy myself of its deodorizing qualities. I have placed it on plates or dishes in vaults, in close rooms, &c., &c., and other places emitting offensive odours, and in every instance found the experiment eminently successful (Hear, hear). I must confess that at first I was sceptical, more especially when applied for the purpose of purifying the atmosphere in sick rooms. But my experiments never failed; and all doubt is removed by the following case, which I give on the authority of a medical practitioner of eminence, who is present—Mr. Bullock, of 15, Cumberland-street, Bryanston-square, which is thus recorded by him:—

"Chloride of lime, and other disinfectants, had been used to destroy the effluvia in the chamber of a patient of Mr. Bullock's; but the change of atmosphere of the room was as obnoxious to the sense as the effluvia itself; and a lady, the mother of the patient, fainted if she remained in the apartment.

An experiment was tried with the peat charcoal; a small quantity of it was spread on trays, and placed in the different parts of the chamber, which in a very short time (to use the words of the lady) became as pure as her drawing-room; and though the patient became worse and died, she was able to sit by his bedside whilst he lived without experiencing the slightest inconvenience; and even after his death, the atmosphere of his chamber was completely clear of the least offensive smell."

But let me describe to you an operation performed at Windsor, in a house within five hundred yards of where the royal standard of England flies. During the prevalence of cholera there, and when the Queen was expected, I was requested by the Board of Health of Windsor to examine a house, whose inhabitants complained they could not continue to live in it unless a cesspool at the back was removed. This could not then be done. The smell was so intolerable, that the windows could not be closed for a few hours; if they were, the tenants were compelled to seek fresh air by opening the doors even during the night. I examined the house, &c., and found that ammoniacal sulphuretted hydrogen rose by capillary attraction through the walls, and into the room. The plate, and even the painting of the closet doors, were blackened by its action. I placed a lining of three brads, six inches from the wall, and then filled in between granulated peat charcoal, and in less than half-an-hour the room was completely deodorized—(Hear, hear)—so much so, that a child about eighteen months old, who previously, its mother told me, would never endure the room for a minute, remained in it without any complaint. Having given here proofs of the deodorizing properties of peat charcoal, I shall briefly detail some of its other properties. As a manure, it is, I believe, superior to any other. I find, under every circumstance, that peat charcoal, when applied early in autumn, produces abundant crops. During the whole winter, it is receiving ammonia and salts, and never gives them out until the plant draws them forth. There is a continuous action, by the absorbing process, of the peat charcoal. Every time the rain comes down, the charcoal receives and retains its nutriment, and in due time imparts the moisture and manure to the crops. Five years' experience satisfied me, that if the planting of potatoes take place in autumn, with about a handful of peat charcoal on each seed, the disease would soon cease to exist. I have this year, close to Dublin, three acres of potatoes manured with the peat charcoal; and about the same quantity of potatoes at the farm in Kildare, which had the usual manure, are diseased. When we witness its effects, as I have done, we must at once see the peat charcoal is most valuable. It is natural that the public should be sceptical. So have been the most scientific men. Dr. Lindley doubted at first, but he now says to his correspondents on this subject, "Use it for onions, but it is good for anything." (Hear, hear.) In London, and all great towns, all offensive odours, and the evils arising from putrescent matter, can be got rid of by its agency. I have proved before the Commissioners of Sewers, in Dublin, that by throwing a tenth part of charcoal into the worst cesspools, that the matter may be drawn in carts, on the warmest days, through the open streets. But I recommend the application of equal parts, as the best general manure which contains the following components, viz.:—Peat Charcoal: Carbon, hydrogen, nitrogen, oxygen, sand and clay, oxide of iron, phosphoric acid, silicate of potash, chloride of sodium, carbonate of lime, sulphate of lime, &c.; possessing as a whole, the power of absorbing, deodorizing, and retaining for the uses of vegetation, the components of human excretæ. Excretæ: Phosphate of ammonia, phosphate of lime, phosphate of magnesia, phosphate of

soda, phosphate of iron, chloride of sodium and alkaline sulphate, sulphate of lime, sulphate of soda, sulphate of potassa, hydrochlorate of ammonia, lactate of ammonio, free lactic acid, *urea*, uric acid, *animal matter*, mucus, earthy phosphates, &c., &c. One ton of the peat charcoal manure is sufficient for one acre. The deodorizing properties of peat charcoal have been fully and most successfully tested before two public meetings in Dublin, held at the Mechanics' Institute; before the Royal Dublin Society; and at a meeting of the Sanitary Association, presided over by Sir Edward Borough, Bart.; also at the Mechanics' Institute, and before a meeting at King's College. As a manure it has been tested with guano and other manures, and in its lasting qualities I believe it will be found vastly superior. In heavy lands it acts as sand, and aids filtration; in light lands it holds and supplies moisture to the soil. Arrangements are making at Eton to collect the whole matter of the town, passing the water through peat charcoal so as to run in a pure state into the Thames, and then introducing the solid matter for sale as a manure. It will be done upon the principle shown in the diagram—the matter will flow into one channel for 24 hours, and then into another, the intermixture being made in the first while the second is filling. This arrangement may be made in London and other towns, and tanks, such as I show in this diagram, occupying about 30 by 20 feet, placed *under* the street, may receive and collect the matter of 500 to 1,000 houses daily, and the manure may be produced like the sample I have shown you, and sent in sacks all over the country. In fact, all the waters of the sewers may be made to pass away into the rivers in a pure state, and a continued manufacture of manure take place. In St. Ann's parish, Dublin, they have commenced operations by collecting the matter in carts, and intermixing it with the charcoal, to be sold for the good of the parish, and other parishes are preparing to follow the example. The time is not far distant when every town in England will, through the agency of peat charcoal, collect its annual refuse, and render it a source of profit and wealth. It is a novel proposition, and therefore will take time to be understood and acted upon. Still I repeat my former assertion, *that I believe ere long every city and town in the United Kingdom* will adopt peat charcoal for the purposes mentioned, and will find the operation to pay *most handsomely*. It may be asked—How can this be effected? How can such a supply of the charcoal be obtained? My answer is *from the bogs of Ireland* (Hear, hear). The Irish Amelioration Society has now a model station in full work at Derrymullen, on the bog of Allen, 21 miles from Dublin. The painting before you represents a scene something like it. If anyone visits the station he shall witness *more* than is there represented; where we have upwards of 300 men, women, and children in full work. When we first took the station it was a wild waste. Nothing could be more miserable in appearance or in reality. The poor peasantry, the moment they heard of our arrival, flocked to the spot, most anxious for employment, and some offered to work for 2s. 6d., or for "*anything our honours would give*," a week. They had scarcely a rag on them. We employed them at 6s. a week, and put them in a condition to enable them to work. I never saw anything to equal the anxiety of those poor creatures to get employment. The first week they achieved their work with an energy peculiar alone to the lower classes of Ireland. I would not pay them until their work was done, to test their sincerity and industry, almost starving it may be said. They worked for their very lives. In about a fortnight a great change came over them. First, they scarcely uttered a word—a settled sadness rested upon them, and not a sound was to be heard; but then

gladness and cheerfulness prevailed all around, where before nothing was to be seen but melancholy and despair (Hear, hear). The medical attendant of the district said to me a few days since—"Before your society's operations commenced, everything was misery; many lived on nettles; all were in rags; to have shoes was the exception—now it is the rule, yet we are working them only about *six months*." The change is almost incredible, and the amount of good achieved within the period equally incredible; but I would say—*Doubt me*, and come and see and judge for yourselves (Hear, hear). I have told you of the virtues and properties of *peat charcoal*, now let me tell you something of the virtues of the people engaged in making it (Hear, hear). More grateful, more hardworking creatures cannot be; and so zealous are they at their work, that they sometimes make bets amongst themselves as to who will do the most; yet the average wages, including carpenter, and other tradesmen, do not amount to 5s. a week each; and small as are their wages, they are enabled to support in comparative comfort their families, who, I believe, reckon above 1,000 individuals, all of whom are thus kept out of the workhouse (Hear, hear, and applause). Fever is frequent at this period of the year, and unsolicited by any one connected with the establishment, they weekly subscribed to a fund for the support of those so attacked. Last week their subscriptions for *one man* amounted to *eleven shillings* (Hear, hear). They have no settled sum; each appears to give what he can—more one week than another, but always something. When cholera and fever raged at different times, a medical gentleman of the neighbourhood attended the people generally, and was most assiduous in his visits. They have now proved they have not forgotten his kindness. In a body the workmen came to me some time back and spontaneously expressed their gratitude for the doctor's kind attention, and begged that he might be appointed the medical officer to the Society, and that each would contribute weekly to pay him. Their desire was complied with, and they now pay with the utmost regularity a penny a week each to the fund—as much, I believe, in gratitude to Dr. Dyas for the past, as for his present good (applause). Allow me now to state the following fact as an evidence of their *honesty*: A short time since five planks were missed from the works. We had reason to suspect that they had been stolen by one of the workmen who was of indifferent character. The next day we called the workpeople together, told them that in England it was imagined that the Irish were lazy and would not work, and that they were also *dishonest*—that they would see there were strong grounds *now* for believing the latter charge was well founded, and that the character of every one in the works was at stake until the planks and the thief were produced. It is not too strong an expression to say the *masse* appeared truly *indignant* at the charge. The works were stopped for the day, and they were told by the Superintendent to go search for the planks. They spread themselves over the district, literally converted themselves into a police, and at five the same evening the planks were discovered and brought back to the station, and with them the name of the thief (applause). A voice, "Was he one of the workmen?" He was. I hope, my Lords and Gentlemen, that I have stated sufficient to convince you of the advantages that will arise to Ireland from this Society, and of the consequent necessity there is for all who are anxious for the welfare of that unhappy country to aid the undertaking. If within the short distance of 21 miles from Dublin so much good has been achieved, and such great benefits have been conferred by our works, all of which produce considerable profit, what, I ask, would be the blessing that would be conferred on the naked starving population, and the country generally, were those works extended throughout

the whole--each yielding a profit, not alone to the employed, but to the employers? (Hear, hear.) And this fact, which is truly honourable to the poor, should be well known: they have the greatest abhorrence to the workhouse; so much so, that they will endure the greatest privations sooner than enter it. (Hear, hear.) But I am happy to state the fact that several of our workmen have removed their parents from the workhouse, and have taken them home and shared with them their earnings. (Hear, hear.) But there is great danger in our allowing them to become the inmates of workhouses; when once there, they perhaps can rarely leave it. On their admission, their clothes are taken away, and stored—usually a bundle of rotten rags—the workhouse garb is substituted, and if a few months pass, the original clothes become utterly useless. Thus all hope of release is removed, for they are unable to provide themselves with other clothing, and must consequently remain, or leave it naked. When we first established the station, the peasantry, as I have already said, were literally in rags; many of them mere skeletons, or more like spectres from the grave than living beings; but now they are clothed, and look contented and happy; and every day that happiness continues, gives to the society profit. (Hear, hear.) But, my lords and gentlemen, I must not detain you longer, although I feel that I have made many omissions. I trust you will see that there are considerable pecuniary advantages to accrue to this country and Ireland from the manufacture of peat charcoal and the reclamation of bog land in Ireland; whilst the most favourable opportunity offers to alleviate the miseries and raise the condition of so many millions of our fellow creatures. (Hear, hear.) Mr. Rogers concluded by hoping that he might be freely questioned upon any point desired. (Hear, hear.)

Lord NAAS: Are you now selling charcoal in Ireland?

Mr. ROGERS: Yes; and hope to increase our supplies daily.

Lord NAAS: At what price?

Mr. ROGERS: At 35s. a ton.

Lord NAAS: Have you other works going on?

Mr. ROGERS: The station at Derrymullen is being increased, and is now in full working condition. But we are proceeding with preparations for others, which we expect to have soon in operation. Of course we have difficulties and delays to encounter.

Lord NAAS: No doubt; and difficulties that could neither be foreseen nor avoided. What is the quantity of the charcoal as compared with turf?

Mr. ROGERS: I stated in my original estimates, about one to four tons. I said an average of a fourth. I am happy to say it will be a third when in proper work.

Lord NAAS: What does it average as regards bulk and size?

Mr. ROGERS: It diminishes in size in about an equal ratio to the proportions just mentioned.

Lord NAAS: What is the mode of manufacturing peat charcoal?

Mr. ROGERS: We place the peat in a furnace, shaped like a pyramid, say five feet base, diminishing until to a foot from the top. It is then set fire to, and when sufficiently carbonized, the fire is extinguished; the water rises round the furnace sufficient to exclude the atmosphere. The carbonization is thus effected without cost of extra fuel, as in the preparation by retorts. Its own combustion effects the purpose. The heat given out completes the drying of the peat, which is piled on a frame over the furnace. With the exception of the compressed peat, all those samples on the table before you are prepared by one general operation. The charring, now continued day and night, and the drying and carbonizing, will continue throughout the year (Hear, hear). The workmen place the turf as it is cut on trays,

in the manner shown in the drawing, while the boys and women pile them to dry, first in the open air, then in a building over the furnace. The process is so simple that the people readily learn it.

Hon. C. S. CLEMENTS, M.P.: Of what are those furnaces made?

Mr. ROGERS: Wrought iron.

Hon. C. S. CLEMENTS, M.P.: I suppose you alter your operations according to the character of the bog, and the necessities of the different places where you erect stations?

Mr. ROGERS: The principle will be the same in all situations. In some instances we may alter slightly our operations; but as yet we find no results above our estimates (Hear, hear). To be on the safe side, I originally estimated that we should use each furnace only once in twenty-four hours. Now, we repeat that operation three or four times in that time; in other words, we shall burn 60 furnaces *per diem*, in place of 15, in each station-building.

Hon. C. S. CLEMENTS, M.P.: How is the peat dried by the furnace without catching fire?

Mr. ROGERS: It is placed on a frame raised above the furnace.

Lord NAAS: Is it necessary to compress the peat?

Mr. ROGERS: Certainly not, as the properties of the samples show. If it were compressed, it would be less efficacious for sanitary purposes, or as a fertilizer. The greater its porosity, the greater its effect.

Mr. PINNEY: Everything is so admirably arranged that none of the heat of the furnace is lost during the operation of combustion.

Mr. ROGERS: Under the furnace water is admitted to exclude the atmosphere when required; and over it the peat or turf is finally dried.

Hon. C. S. CLEMENTS, M.P.: Is the drying room under cover?

Mr. ROGERS: Yes. All the operations are carried on in a well-covered frame-building, formed of louver-work, which allows the free admission of air and the escape of moisture.

Lord NAAS: Is the building near or on the bog?

Mr. ROGERS: On the bog, erected on piles.

Captain SMITH: How is it used to purify offensive matter in a stagnant pool, previous to the latter's removal to some distance from the spot where it originally collected together? and what is the proportion of the manure to the acre?

Mr. ROGERS: If you wish to deodorize "stagnant pools" or sewers, simply strew half-an-inch of the prepared charcoal over the surface. So long as it prevents contact with the atmosphere, no ill effects can take place. Every grain of the charcoal takes up 90 times its own volume of the offensive gases. One ton of properly prepared peat charcoal manure is, I conceive, more than sufficient for an acre of poor land. I believe 5 to 10 cwt. is sufficient for many soils, especially if used in autumn (Hear, hear).

Mr. WAKLEY: Is there anything in the constituent parts of the Irish bog, or is it subjected to any previous process to make it superior to the bogs in this country, or in Scotland?

Mr. ROGERS: I believe the Irish bogs to be generally superior; but although there is a difference in the quantities of their constituents, the same are to be found in England and Scotland.

Mr. WAKLEY: That being the case, there is no reason why others should not claim a paternity for the advantages, promised by this society, from the Irish bogs.

Mr. ROGERS: What I say is, the Irish bog enjoys no advantage from any peculiar purity. Compared with others the bogs of Ireland are superior, and better adapted for the purposes for which we intend them (Hear, hear).

Mr. W. WHITE stated that he was a practical chemist, and had examined the charcoal produced from the turf of England, Ireland, and Scotland. He found in that from Ireland 87 per cent. of pure carbon, and but about 2 per cent. of silica. In the peat charcoal of England he had found a great deal less carbon, and a great deal more silica; but he could not certainly agree with Mr. Rogers as to the value of the manure to the extent stated. There could be no doubt it was a valuable manure, but he thought it wanted more phosphates. He ascribed the difference of the turf of the different countries to the soil from which it sprung, and therefore thought there would be a great difference in different bogs.

CHAIRMAN: Peat no doubt varies according to the soil by which it is surrounded. Experiments have been attended with different results, according to the position of the bog; some peat is good, some is better, and some is worse. Peat charcoal has one advantage, which is its power to absorb the salts which are usually lost in other manures. Its retention of the volatile particles, and its power to communicate them to the soil, are unquestionable, and are decided advantages (Hear, hear).

LORD NAAS: Do you prefer the black turf?

Mr. ROGERS: No; the black turf contains too much silica, and should not be used as manure. We use it as fuel, for which it is most valuable. For steam purposes the black turf is admirably adapted; its blaze acting generally round the boiler gives more steam, whilst the absence of sulphur preserves the iron from injury. No doubt there is a difference in the quality of turf, but it arises not from the subsoil, but from the surrounding high grounds. I have found in and on the bogs traces of the peculiar characteristics of the high grounds encircling them. As regards the absorbing qualities of the peat it has been recently proved in France that peat charcoal absorbs the saline properties of sea-water, and that the water can be drunk like fresh water. Peat during its absorbing process takes in the salt while it filters upwards.

Mr. PINNEY, M.P.: I have found such to be its absorbing character as regards saline and other volatile particles.

Mr. SHAW: I regret that I did not bring with me an analysis of the peat charcoal manure, peat charcoal and night soil mixed, very carefully made by an experienced agricultural chemist, Mr. Nesbit, of Kennington-lane, Lambeth; by which it is proved that this manure is of about one-half the value of guano, as regards its apparent fertilizing quality, and can be sold at one-third of the price.

Mr. WAKLEY, M.P.: In referring to Mr. Rogers' statements, I think, if my memory does not deceive me, that he attributed "disinfecting" qualities to the peat charcoal. So that according to him it is a disinfectant as well as a deodorizer. Perhaps the terms are, with him, synonymous. In either case he is wrong. As a medical man I can state that there is no analogy between infection and smell. You may deodorize a room, but you cannot by the same agency destroy the infectious disease. You may deodorize an hospital, but you cannot by the means of peat charcoal destroy the infectious qualities of smallpox, scarlatina, or fever. I therefore think that the term should be strictly limited to the qualities of the peat. And as other proprietors of bogs may think that they have similar means of producing an article in every requisite equal to that which is produced in Ireland for manure deodorizing and general domestic purposes, we should at once prove the superiority of the Irish bogs—if they are superior—to prevent other persons embarking into the speculation in which the society is now engaged, and thus secure it from the evils that naturally attend competition and rivalry in any undertaking or speculation. After hearing the clear, and cer-

tainly not overcharged, statements made here this day, my candid and cool conviction is that the speculation promises the greatest success; that it will confer incalculable advantage upon Ireland, and greatly benefit England. And, therefore, it shall have my best wishes, and my most strenuous support (applause).

Mr. ROGERS: I have been misunderstood in the conception that I used the word "*disinfecting*." I am aware it is a "vexed question" amongst medical men of high eminence—whether deodorization be a "*disinfecter*." I have therefore only stated peat charcoal to be a *deodorizer*. At the same time, I have a strong opinion that *peat charcoal* is a disinfectant—if *any thing can be*. Deodorization by other means is effected by the action of other *odorous* components, or the liberation of one or more gases to neutralize that considered to be most noxious; thus, whilst there is a combination of gases, there is no *removal* of any. The *reverse* is the effect with peat charcoal. Perfectly pure itself, it absorbs—almost magically draws to itself—all the noxiousness of the matter or the atmosphere; and then gives it out again, unless it be actually destroyed by fire. It yields no odour, but takes all that surrounds; hence why I believe it may be deemed to be a *disinfecter*, if *disinfection* be possible. (Hear, hear).

LORD NAAS, M.P., said it gave him great pleasure to express his own great satisfaction at the highly-interesting information which had been given them by Mr. Rogers, for which they must all feel indebted. There could be no question of the value of the measure, and the great good it will accomplish. He then begged to move the following resolution:—"That the best acknowledgements of this meeting be conveyed to Mr. Jasper W. Rogers, C.E., for the interesting lecture which he has delivered on the value of peat charcoal as a fuel, and a great variety of other highly useful public and private purposes."

SIR ROBERT PRICE, Bart., M.P., felt happy in seconding the resolution. He would not take up the time of the meeting after so clear and explicit an exposition. It was a most entertaining subject, which affected all present and the manner it had been brought forward deserved all praise.

Hon. C. S. CLEMENTS, M.P., moved "That the cordial thanks of this meeting be tendered to the Right Hon. the Lord De Mauley, for the courteous and able manner in which he has this day presided over its proceedings."—Which was carried by acclamation.

The Noble CHAIRMAN, in acknowledging the compliment, said—I assure you, my lords and gentlemen, that in joining this society my sole object was to give employment to the Irish people by means best calculated to develop the resources of Ireland (Hear, hear). I can also vouch that the same feeling and the same desire actuated the other gentlemen who are making such strenuous exertions to effect those objects (Hear, hear). Of ultimate success we have no doubt. But we are particularly anxious that our works should, without delay, be spread over the whole country, wherever bog land is to be found, in the hope that the remunerative employment which must be consequently given to the peasantry, may be as speedily as possible distributed amongst them, and that they may be thereby rescued from all the horrors of misery, with which it is to be regretted they are at present surrounded (Hear, hear, and applause).

Mr. PINNEY requested the adjournment of the meeting to the dining-room, where a *déjeuner* was served. The measure was again accurately discussed over the hospitable table of the kind-hearted host, who received the acknowledgments of one and all for thus devoting his house, his purse, his talent and time to an undertaking fraught with so many advantages for the general good, and which he had that day so well supported and ably advocated.

THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

ECONOMY OF MANURES.—DR. ANDERSON'S LECTURE.

On Wednesday, July 31, a lecture on this subject was delivered in the Trades' Hall, by Dr. Anderson, the chemist of the society. The assemblage on the occasion, which was numerous, was almost entirely composed of agriculturists both from our home counties and from a distance. The learned gentleman was accompanied to the platform by the Lord Provost and the Duke of Roxburghe. On the motion of his Grace, his Lordship took the chair, and introduced Dr. Anderson to the meeting. He was received with considerable applause.

Dr. ANDERSON proceeded as follows:—It will be admitted, I think, on all hands, that there is scarcely any subject more deserving the attention of the farmer than the careful management of his manures. Under any circumstances this is a matter of vital importance; but the progress of agriculture, which now more than at any former time compels every man to obtain from his land the greatest possible amount of produce, has given it even greater prominence than it before possessed, and necessitates a far more careful attention to the subject in all its bearings than it before required; and the introduction of what are commonly called artificial manures has had the effect of still further complicating the whole matter, and opening up questions which a very short time since would have been considered altogether beyond the range of such inquiries. The consequence of this is that our knowledge is at the present moment in a purely transition state, and is deficient in much of that definite information which is requisite for enabling us to arrive at legitimate conclusions regarding the comparative values of different manures, and many other points which it would be most desirable to have established in a satisfactory manner. In fact, any one who has occasion to inquire into those matters has questions constantly presenting themselves to him, in regard to which we possess no information at all; or other cases in which they render probable certain conclusions which might be established by the results of experiments made in the field, which have either never been made, or have been done without those precautions required to raise them above the chance of fallacy. It has appeared to me that the present affords an advantageous opportunity of calling your attention to questions which must unquestionably depend for solution on the mutual exertions of science and practice. For I hold it to be certain that the two must go together, and that though some of the facts we require may be determined in the laboratory, there are many questions which, though suggested by science, can be established only as facts by experiments in the field, performed with every attention to care and accuracy. I hold also that neither of these methods of experiment will in themselves suffice; they must go hand in hand if our results are to be of value. Separately the chances are that they lead to mere speculations, of which science will supply one set and practice the other; for you must allow me to say that practice has abundance of speculations of its own, which are often much wilder than those on which science ventures. In discussing the general questions of the economy of manures on the present occasion, I must be contented to do so only in a very general manner, as your time will not permit me to go into any details. My intention is rather to bring out some facts little attended to, and if possible to draw from the practical farmer such information as he

may possess, or to induce some of those who now hear me to add themselves to the number of those who endeavour experimentally to add to the common stock of information. And I shall advert, in the first place, shortly to the general properties of manures; and in doing this I may possibly have to touch upon some matters with which you may be already partially acquainted, yet which cannot, nevertheless, be too frequently brought under your notice. If we examine then any of our common plants, we find it to be composed of a considerable number of chemical substances. These substances may be divided into two great classes; separable from one another by a very simple experiment, which is neither more nor less than burning the plant. When this is done we obtain its *ash*, containing the whole of one of these classes; the other has in the process of burning passed into the state of gases, and so escaped the observation of our unassisted senses. The former of these are called the *mineral* or *inorganic* constituents of the plant, the latter the *organic* constituents, because they are peculiarly present in all organized beings. The latter of these classes is a limited one, and contains only four substances: carbon, hydrogen, oxygen, and nitrogen. The former is much more extensive, and comprehends a considerable number, of which the most important are sulphuric acid, phosphoric acid, lime, magnesia, potash, and soda. Now the existence of the plant depends upon its obtaining all these, as well as one or two less important substances, in sufficient quantity; without these it cannot flourish, and just in proportion to the amount in which they are supplied will be the luxuriance of its growth. I say the growth of the plant will be proportional to the supply of these constituents. This statement, however, is not to be taken in its widest sense, because nature has fixed a certain *limit*, beyond which no supply of these substances, however liberal, will raise its growth, but up to that limit the statement is substantially correct. From whence, then, is the plant to derive these substances? And in answering this question it is necessary to distinguish between the two classes of substances to which I have already referred, and to inquire separately into the sources of each. Of the inorganic constituents there can be but one source, the soil namely, which to be fertile must contain the whole of these substances in greater or less quantity. It is different, however, with the organic constituents, which have a twofold source, and of which part, or even the whole, may be derived from the surrounding atmosphere. The atmosphere is in fact a great reservoir of the organic constituents of plants, of which it contains all four; two of these, nitrogen and oxygen, forming almost the whole of it; the other two, carbon and hydrogen, existing in smaller proportion in the forms, respectively, of carbonic acid and the vapour of water. It must be understood, however, that all soils contain a certain quantity of the same substances, in the form of what is called *organic matter*, in a state in which all these four substances may be supplied to the plant. Now every fertile soil contains *all* the constituents of the plants which grow upon it, and that too in sufficient quantity to supply many successive crops, a position which I have had recently an opportunity of illustrating in a very complete manner, in a series of analyses of the wheat soils of Scotland, published in the last number of the *High-*

land Society's Transactions. I have there shown that even nitrogen, of all others the element which we should least expect to find in them in abundance, nevertheless exists in what must be considered a comparatively large proportion. But it is important to observe that it is not enough that these substances shall exist in the soil; it is further necessary that they be present in a state in which they can become available to the growth of the plant. Now, to provide for this, nature has introduced an extremely beautiful and important provision. In order that these substances shall be absorbed by the plant, they must exist in a soluble condition. It is, however, very manifest, that if the whole valuable constituents were soluble, the good effects of such an arrangement would be altogether defeated, for the rains would soon wash away from our soils all that they contained of valuable matter. To obviate this, however, nature has so arranged it, that these constituents exist in the soil in the state of insoluble compounds, which, under the influence of air and moisture, gradually undergo a series of very complex decompositions, which slowly liberate the constituents, as they are required to support the life of the plant. But nature has fixed a limit to this change, and has caused these constituents to become soluble with extreme slowness only, and in no greater quantity than is requisite for supporting that amount of vegetation which the general economy of the globe requires. Now the whole principle of cultivation is to obtain, by proper treatment, from a given surface of land a greater amount of vegetation than it is capable of producing in a state of nature. And this is effected partly by tillage, which breaks up the land, and by the admission of air and moisture facilitates the decompositions, by which these valuable constituents of the soil are liberated from their insoluble state. The other and far more important means is by the addition to the soil of those substances which the plant requires, in other words by the use of manures. A manure, then, ought to contain *all* the substances which a plant requires for its growth. And this is unquestionably what a manure of theoretical composition should do. Nay, more, it ought to contain these substances exactly in the proportion which the plant requires, so that no waste may occur. It must, however, be manifest to every one acquainted with agriculture, and still more manifest to every one acquainted with chemistry, that it is impossible to carry out practically what is true in theory; nevertheless, the aim of skilful and scientific practice ought to be to approach as near to theoretical perfection as it is possible to do, though in the very nature of things we cannot even hope absolutely to arrive at it, or even near it. Although, however, we cannot hope to arrive at perfection, we may advantageously aim at a somewhat lower and less difficult standard, for experience and science concur in showing that all the constituents of a manure are not as equally important, but that those are most essential which the plant has greatest difficulty in obtaining from other sources. Now, in this point of view, nitrogen is the most important of all the constituents of a manure, because it is that which nature supplies least abundantly. You may possibly express some surprise at this statement, considering that I, not many minutes since, mentioned that it is at present in enormous quantity in the atmosphere. But it so happens that nitrogen is exactly of all others the substance which most peculiarly requires to be presented to the plant in a special condition. It has been established on most unequivocal evidence that the plant cannot absorb nitrogen *as such*, and that all this immense mass of nitrogen existing in the air is not strictly useful to the plant, while it is only a very minute quantity existing in it, in the state of ammonia, which is of immediate value. And of the immense disproportion

between the amounts of nitrogen in what I may call an inert and an active condition, some idea may be formed when I mention that 100 lbs. of atmospheric air contain about 77 lbs. of nitrogen, and, according to a recent determination, not more than $\frac{1}{4}$ of a grain of ammonia. I shall not attempt to enter here upon the question of how the nitrogen of the air passes from its inert into its useful state—a question of much intricacy, which has occupied the attention of many distinguished chemists, without having as yet obtained a perfectly satisfactory answer. It is certain that, under certain circumstances, the nitrogen of the air may pass in small quantity into the state of ammonia, but the supply so obtained is small and uncertain. The great source of ammonia is the decomposition of animal and vegetable substances containing nitrogen, which, sooner or later, give off the whole of that element they contain in the form of ammonia. Next to ammonia in importance may be placed phosphoric acid, which is likewise a comparatively rare natural product, and of which also the great source in animal and vegetable sources, all of which, but especially animal substances, contain it in quantity. It is true that it is found also in the mineral kingdom; but it exists there so sparingly that as yet scarcely any advantageous use has been made of that which is obtained from this source. You will observe then, and it is a matter of great practical importance, that the principal source of the two most important constituents of plants is from plants themselves; for even that portion obtained from animals comes originally from the plants upon which these animals have fed. And the same may be said of potash, of which the great source is still from plants. This is a point which I wish to impress particularly upon you, that plants form the great source of these substances, and that this is true, not merely of these substances as manures, but even when you go into a druggist's shop, and buy pure ammonia, phosphoric acid, or potash, every atom which you get has at some time or other existed in a plant or an animal. These observations lead me directly to the consideration of that manure which consists of the decomposing portions of plants, and that of course is farm-yard manure, the most important of all, that on which the farmer must always be mainly dependent, and, I think I may also say, that regarding the economical management of which we have the least amount of definite information. I beg it to be understood as my decided opinion, that farm-yard manure must always be the farmer's main stay. I am aware, indeed, that some have thought otherwise, and we have all heard of an eccentric gentleman who expressed his opinion, that the time would come when the farmer would carry his manure to the field in his waistcoat pocket; and though no one is now-a-days so absurd, some people still seem to expect that some complete substitute will be found for farm-yard manure. I can assure you, however, that any such supposition is utterly extravagant, and is certainly uncountenanced by chemistry. I do not mean to say that chemistry could not produce a substitute; but what I mean is, that the farm-yard manure must always be much cheaper than any substitute which could be manufactured; and the reason is to be found in the fact, that the constituents of such a manure must be extracted from plants, which must necessarily be expensive. While even supposing that to be done, farm-yard manure *must*, in the very nature of things, still always be produced. No question can then be conceived of more importance than that of obtaining this manure in its most perfect state, but how that is to be done is exactly one of those questions still unsettled, and which I believe to require very complete and careful field experiments. The exact chemical estimation of the comparative values of different specimens of this manure is a very difficult matter; partly from its extremely complex nature, and partly from the many

questions it involves. Of course, good farm-yard manure will contain more or less of all the constituents of our crops; but, in estimating its value, we must be contented to take into consideration only its most important constituents, and, in this way, I conceive we may obtain a sufficiently near estimate, by knowing the amount of nitrogen and phosphoric acid which it contains; but of these, for many reasons, the first is by far the most important, as it is in respect to it that the value of farm-yard manure appears to vary most. In the management, then, of farm-yard manure, two different questions require to be considered—first, the production of a manure containing the greatest possible amount of nitrogen; and, secondly, the successful conversion of that nitrogen into ammonia. It is not unimportant, of course, that the other constituents of the manure should be present in abundance; but it may be assumed, as generally true, that the treatment likely to produce the greatest amount of nitrogen will be that which will produce the most valuable manure in other respects. In regard to the first of these questions, there is a want of definite information. It is a common statement, however, that the value of the manure is dependent upon the nature of the food with which the cattle which produce it are supplied; that, for instance, cattle fed upon oil-cake produce superior manure to those fed on turnips. I am aware that this opinion is not universal, as I have heard it disputed by farmers of skill and experience. I am inclined, however, to believe that the opinion is to a certain extent correct. Supposing, then, that two samples of such manure differ, it must be obvious that it is the dung and urine of the cattle which differ; the *litter* mixed with such dung will be the same in both cases. Now, some experiments made in the laboratory, on the pure dung and urine of cattle fed on turnips and oil-cake, appeared to me to confirm the opinion of the greater abundance of nitrogen in the produce of animals fed with the latter food. It will not do, however, to draw conclusions in such cases from a single analysis, so that I was anxious to have repeated and extended the experiments, but circumstances not within my own control have hitherto prevented my doing so. I would beg you, however, to observe that supposing it to be made out distinctly that farm-yard manure produced by oil-cake contains more nitrogen than that from turnips, still this would not embrace the whole question. It would if you were to buy the manure, when, of course, all that you want is to get as much nitrogen as possible in the 100 tons or any other quantity which you may wish to buy. But it is quite another thing when you come to produce the manure on your own farm. The question then is, not whether 100 tons of the one contain more nitrogen than 100 tons of the other; but whether the whole quantity of nitrogen produced by the one method of feeding is greater than the whole quantity of it produced by the other. Now, we have no experimental information on this point; but I think it may be doubted whether in this point of view there is any such difference, because you will observe that though oil cake contains more nitrogen—in fact about $2\frac{1}{2}$ times as much as turnips—still there is a much greater disproportion in the quantities of these substances with which you supply the cattle. You give an ox daily 1 cwt. of turnips, but no one gives 30lbs. of oil cake daily, but more nearly lbs.; so that, in fact, the ox fed on oil cake actually on the whole receives less nitrogen than when fed on turnips. All these are matters which it would be most desirable to have determined by careful and repeated experiment; it would be a great boon to agriculture to have it set at rest, and I may be permitted to hope that the observations I have now made may be the means of inducing some one to engage in the inquiry. To pass then to another question—sup-

posing cattle to be fed in exactly the same way, so as in fact to produce manure which at the moment of formation is of uniform quality, what are the circumstances under which that manure can be preserved with the least loss of its valuable matter? This question is one of the utmost importance, and calls for the discussion of so many points that it will be impossible for me to do more than refer to it very shortly. On some of these it would be difficult to enter without complicating the matter by opening up the discussion of other subjects. I allude here to what is called box feeding, and feeding in boarded stalls, and sundry other modifications which, independently of the feeding question, have been lauded by their supporters as producing greatly superior manure. I am too little acquainted with the practical results of any of these systems, which so far as I know have been only recently introduced into Scotland, to venture an opinion on their comparative merits. I have little doubt, however, that the manure produced must be superior in quality to the old farm-yard dung prepared in a most imperfect way. But what degree of superiority they possess has not been determined by any satisfactory experiments which have come under my notice. The matter must, in fact, be decided in the same way as other manure questions, by ascertaining not merely the amount of valuable constituents present in the manure, but also the whole quantity produced in a given time. As regards the general question of the preservation of manure, I apprehend that the most important matter is its protection from air and moisture. In the way a common dung heap is made, we have, in fact, exactly the conditions to occasion loss of its valuable constituents. It is exposed to a more or less free current of air, which facilitates the volatilization of the ammonia as it is formed; and it is exposed to the falling rain, which washes out the soluble salts, and what ammonia the winds have spared, into the subjacent soil. It is true that the former of these sources of loss can be got the better of by the use of acids or of gypsum and mixing with earth; but when the ammonia is thus fixed, as it is said, "it is fixed only as regards *volatility*, for it is still *soluble*, and liable to be washed away by rain. In order to have farm-yard dung in the best state, it must be preserved under cover; and, my impression is, that the introduction of covered dung-pits is likely to prove of great importance. There seems to me no doubt that in this way manure, in whatever way produced, must be best preserved. There appears, indeed, to be but one objection, which is, the expense of erecting a roof of sufficient extent to cover the whole manure of a farm. But surely, in these days of cheap building, some sort of inexpensive cover may be contrived. In order to ascertain this, we should have to ascertain by *actual experiment* what is the amount of gain by having the manure kept under cover, so as to know whether it is sufficient to leave a profit on the expense of covering it. We have another matter to attend to, also, in the management of farm-yard manure—its fermentation namely, by which is meant the production of such a decomposition as converts the nitrogen present into ammonia. The importance of this decomposition depends upon the fact that by this means we obtain a manure which acts with greater rapidity than one in which this decomposition has not been effected. The fact is, that the formation of ammonia takes place much more slowly when it has been incorporated with the soil than when it is heaped up in the dung-heap; and, as the nitrogen must pass into the state of ammonia before it is absorbed by the plant, we require to effect as much of that change as possible, if we are to have a manure of rapid action. Having said thus much of farm-yard, he would next speak briefly of liquid manures. The question was a very wide one, upon which he could not enter

at any length. The question was entirely an economic one. To ascertain either the real or comparative value of liquid manures they must be guided by economic results. As they should be aware, there existed a great variety of opinions as to how these were to be obtained. He was of opinion that to give weight to the value of liquid manure it would just require to be made solid, to be changed from a liquid to a dry substance; and this, of course, its physical properties did not admit of. The only process by which it could be done was by evaporation, and to effect that would be more expensive than its application in the liquid form. This was more properly a purely economic than a scientific question, and therefore he would not dwell on it. He had referred hitherto solely to the class of natural manures, and he had laid before them his view that no artificial manure would ever prove a substitute for that of the farm-yard; but though that was the case, they might be, and he believed were, most important auxiliaries. Let them take the commonest kind of artificial manure—he meant, of course, guano—the finest quality of which was the cheapest and the best of the class. He said the cheapest and the best; and it must necessarily be so, because the constituents which were of greatest value to the agriculturist were given in it in a larger quantity than they could be got in any other compound for the same money. His advice then would be to buy the best guano—never purchase inferior. The inferior was greatly more expensive. The decrease in the money value for which it might be obtained was nothing to the decrease in its valuable constituents as compared with the better sorts. The Peruvian was the best kind of guano, and it was by far the cheapest. Farmers were exposed to much risk of imposition in this matter; adulteration was carried on to an extent which it is difficult to credit. He had recently gone over the number of samples of guano that had been forwarded to the office of the society for analysis to the number of 30 cases, and he found that out of that 30 there had only been 9 samples of such a quality as he himself, if purchasing, would have been disposed to accept. And this gave no accurate idea of the proportion of good to bad guano that was in use. Numerous samples of good guano came to the office, but few of those that were thoroughly adulterated, because the vendors of such took care to keep as far as possible out of the reach of the chemist. Let them take guano of the best quality and they would find that two things entered largely into its composition, viz., ammonia and phosphoric acid, the two substances, as he had previously stated, the presence of which was most valuable in farm-yard manure. Now, in Peruvian guano they would find about 17 per cent. of ammonia and of phosphate of lime, a compound of lime and phosphoric acid, 23, 24, or 25 per cent., according to circumstances. In inferior guanos there might be found 23 or 24 per cent. of phosphate of lime, and 1 or 2 of ammonia; and this, instead of being sold at one-third of the price of the other, as it should be, was sold generally at two-thirds. Guano might be considered as the type of a class of manures, and bones might be taken as belonging to it also. The value of that kind of manure was dependent upon two conditions. Some used burned bones. Now, in certain circumstances, that might be advantageous. The addition of phosphate of lime might alone be needed to certain soils. Such a case occurred in the pasture land of Cheshire. The application of bones to that exhausted soil operated almost as a charm upon it. The peculiar nature of the tillage under which it had been kept—all the butter and cheese raised upon it being conveyed elsewhere—reduced it to that state that the addition of phosphate of lime acted powerfully, and was indeed eminently beneficial. But in general such would not be the case, and therefore they should give the preference to bones that were unburned. There was another instance of a similar kind to which he might refer. In many cases he believed that bones were sold from which the glue had been extracted by boiling. This glue was a valuable commercial product. It was used in weaving, for stiffening yarn and other manufacturing purposes; and

several manufacturers had large boilers in which the glue was extracted. The bones were sold afterwards at no diminution of price from that of unboiled bones. In conclusion, the learned Doctor presented a summary of the views he had advanced, reiterating that farm-yard manure could never be altogether set aside by artificial; but though such was the case, they were indebted to the latter for the great extension of cultivation that had taken place of late years. The reason why farm-yard manure was thus important, he hoped he had made plain, as also the necessity for further experiment to confirm or confute many views now broached and to a certain extent entertained. In fact, the observations he had made might be taken not so much as the results of experiment as the suggestions of those experiments that were requisite to test many of the theories to which he had alluded. The learned gentleman resumed his seat amidst much applause.

The LORD PROVOST then proposed a vote of thanks to Dr. Anderson for the very interesting lecture he had delivered.

The Duke of ROXBURGHE cordially seconded the motion, which was carried by acclamation, when the meeting separated.

HIGHLAND AND AGRICULTURAL SOCIETY'S SHOW AT GLASGOW,

ON THE 1ST AUGUST, 1850.

AWARD OF PRIZES.

SWEEPSTAKES FOR SHORTHORN BULLS.

John Mason Hopper, Middlesbro'-on-Tees.

SHORTHORN BREED.

Best bull of any age 20 sovs., Anthony L. Maynard, Marton-le-Moor, Ripon, York, and the silver medal as the breeder; second best, 15 sovs., John Brodie, Abbey Mains, Haddington.

Best bull, calved after 1st January, 1848, 15 sovs., Samuel Wiley, Brandsby, York.

Best bull, calved after 1st January, 1849, 10 sovs., A. Cruickshank, Sittytton, of Straloch, Aberdeen.

Best cow of any age, 15 sovs., Richard Booth, Warlaby, Northallerton; second best, 10 sovs., Richard Booth.

Best pair of heifers (in calf), calved after 1st January, 1848, 10 sovs., Benjamin Wilson, Brawth, Thirsk; second best, 5 sovs., Benjamin Wilson.

Best pair of heifers, calved after 1st January, 1849, 10 sovs., James Gulland, Newton, of Wemyss, Kirkcaldy; second best, 5 sovs., Charles Towneley, of Towneley Park, Lancaster.

SWEEPSTAKES FOR Ayrshire BULLS.

James Andrew, Greenwood, Irvine.

Ayrshire Breed.

Best bull of any age, 20 sovs., James Andrew, Greenwood, and the silver medal as the breeder; second best, 15 sovs., Alex. W. Buttery, Monkland, Airdrie.

Best bull, calved after 1st January, 1848, 10 sovs., Robert Paton, Clobber Hill.

Best bull, calved after 1st January, 1849, 5 sovs., Alex. W. Buttery, Monkland.

Best cow of any age, in milk, 15 sovs., William Glasgow, Silverhill, Bothwell; second best, 8 sovs., Alex. W. Buttery, Monkland.

Best cow of any age (in calf), 10 sovs., James Foster King, West Langhaugh; second best, 5 sovs., James Lindsay Ewing, Kelvin Grove.

Best pair of heifers, calved after 1st January, 1848, 10 sovs., John Barry, Braidwood Meadow, Carlisle; second best, 5 sovs., Alex. W. Buttery, Monkland.

Best pair of heifers, calved after 1st January, 1849, 8 sovs., Nicol Somerville, Windales, Biggar; second best, 4 sovs., John Wilson, yr. of Arden, Airdrie.

Galloway Breed.

Best bull of any age, 20 sovs., Robert Gibbons, Mossband, Cumberland; the silver medal to George Graham, Riggfoot, as the breeder; second best 10 sovs., W. C. Forster Thomson, Solway House, Cumberland.

Best bull, calved after 1st January, 1848, 10 sovs., James Graham, Meikle Culloch, Dalbeattie.

Best bull, calved after 1st January, 1849, 5 sovs., James Graham, Meikle Culloch.

Best Cow of any age, 10 sovs., James Gillespie, Annanbank, Lockerbie; second best, 5 sovs., Helbert Renwick, Parks, Moffat.

Best pair of heifers, calved after the 1st January, 1848, 10 sovs., John Palmer, Hallflat, Carlisle; second best 5 sovs., James Graham, Meikle Culloch.

Best pair of heifers, calved after the 1st January, 1849, 8 sovs., James Gillespie, Annanbank, Lockerbie; second best 4 sovs., James Grierson, jun., Caigton, Castle Douglas.

Best pair of oxen, calved after 1st January, 1847, 8 sovs., Allan Pollok, yr. of Faside.

POLLED ANGUS AND ABERDEEN BREED.

Best bull of any age 20 sovs., William Fullarton, Airdovie Mains, Brechin; the silver medal to Mr. Cooper, Keilbrae, as the breeder; second best, 10 sovs., David H. Adamson, Stanochy, Brechin.

Best bull, calved after 1st January, 1848, 10 sovs., Robert Scott, Balwylio, Montrose.

Best bull, calved after the 1st January, 1849, 5 sovs., Hugh Watson, Keillor, Cupar-Angus.

Best cow of any age, 10 sovs., Hugh Watson, Keillor; second best 5 sovs., Hugh Watson, Keillor.

Best pair of heifers, calved after 1st January, 1848, 10 sovs., Wm. M'Combie, Tillyfour, Alford, Aberdeen; second best 5 sovs., Wm. M'Combie, Tillyfour.

Best pair of heifers, calved after 1st January, 1849, 8 sovs., Hugh Watson, Keillor; second best 4 sovs., Wm. M'Combie, Tillyfour.

Best pair of oxen, calved after 1st January, 1847, 8 sovs., Wm. M'Combie, Tillyfour; second best, 4 sovs., David Welsh, Tillytoghills, Fettercairn.

HIGHLAND BREED.

Best bull of any age, 20 sovs., Donald M'Donald, of Craigrue, Lochearnhead, Perthshire, and the silver medal as the breeder.

Best bull, calved after 1st January, 1848, 10 sovs., Duncan M'Naughton, Gashley, Glenlyon.

Best bull, calved after 1st January, 1849, 5 sovs., Messrs. Stewart, Invermeran, Fortingal.

Best cow of any age, 10 sovs., Neil Malcolm, of Poltalloch; second best, 5 sovs., Marquis of Breadalbane.

Best pair of heifers, calved after 1st January, 1847, 10 sovs., Marquis of Breadalbane; second best, 5 sovs., Donald M'Laren, Glenartney, Callander.

Best pair of heifers, calved after 1st January, 1848, 8 sovs., Donald M'Laren, Brae Leny, Callander; second best, 4 sovs., Neil Malcolm, of Poltalloch.

Best pair of oxen, calved after 1st January, 1846, 8 sovs., Neil Malcolm, of Poltalloch; second best, 4 sovs., Lord Douglas, Douglas Castle.

FIFESHIRE BREED.

Best Bull of any age, 15 sovs., Andrew Aitken, Carnbee, Anstruther, and the silver medal as the breeder.

Best bull, calved after 1st January, 1848, 10 sovs., John Rintoul, Ovenstone, Pittenweem.

Best cow of any age, 10 sovs., Andrew Aitken, Carnbee.

Best pair of heifers, calved after 1st January, 1848, 10 sovs., David Wallace, Balgrummo, Leven.

HORSES FOR AGRICULTURAL PURPOSES.

Best stallion, 30 sovs., Robert Arkley, Philipstoun, Linlithgow, and the silver medal as the breeder; second best, 20 sovs., Andrew Leiper, Yarbent, Strathaven.

Best entire colt, foaled after 1st January, 1847, 20 sovs., Samuel Clerk, Mauswraes, Kilbarchan.

Best entire colt, foaled after 1st January, 1848, 15 sovs., Charles Phillips, Cracrop, Brampton.

Best entire colt, foaled after 1st January, 1849, 10 sovs., John Wilson, yr. of Arden, Airdrie.

Best mare, 15 sovs., Alexander W. Buttery, Monkland; second best, 10 sovs., Archibald M'Kerrow, Auchinsterry, Cumbernauld.

Best filly, foaled after 1st January, 1847, 10 sovs., Alexander W. Buttery, Monkland.

Best filly, foaled after 1st January, 1848, 8 sovs., Robert Finlay, of Easterhill, Glasgow.

Best filly, foaled after 1st January, 1849, 5 sovs., David Fleming, Westthorn, Glasgow.

EXTRA PREMIUMS.

For the best pair of cart horses or mares, possessed by the exhibitor, and generally worked on the streets of Glasgow from

1st April, 1850; ten sovs., or the gold medal, Dugald Napier, Glasgow, and a silver medal to the driver.

Best cart horse or mare, possessed and generally worked on the streets of Glasgow by the owner himself from 1st April, 1850; eight sovs., Robert Bryson, Glasgow. Second best, five sovs., John Pollock, Laurieston, Glasgow.

SHEEP.—LEICESTER BREED.

Best tup, ten sovs.; the second best five sovs.

The best pair of Dinmont or shearing tups, ten sovs.; and the second best, five sovs., to Samuel Wiley, Barnsby, York.

Best pen of five ewes, eight sovs., James Douglas, Athelstaneford, Haddington. Second best, four sovs., Lord Kinnaird, Rossie Priory.

Best pen of five shearing ewes or gimmers, five sovs., James Mitchell, Little Knox, Castle Douglas. Second best, three sovs., George Thomson, Haymount, Kelso.

CHEVIOT BREED.

Best tup, ten sovs., James Brydon, Moodlaw, Langholm. Second best, five sovs., Nicol Milne, Dryhope, Selkirk.

Best pair of Dinmont or shearing tups, ten sovs., Thomas C. Borthwick, Hoprig, Langholm. Second best, five sovs., Thomas C. Borthwick; and the best pen of five ewes, eight sovs., Thomas C. Borthwick. Second best, four sovs., James Bryden, Moodlaw.

Best pen of five young ewes, five sovs., James Bryden, Moodlaw.

Best pen of five gimmers, five sovs., Wm. Paterson, Twiglees, Lockerbie. Second best, three sovs., Thomas C. Borthwick.

BLACK-FACED BREED.

Best tup, 10 sovs., David Foyer, Knowhead, Lennoxton, Stirling; second best, 5 sovs., Robert Paterson, of Birthwood, Biggar.

Best pair of Dinmont or shearing tups, 10 sovs., David Foyer, Knowhead, Lennoxton, Stirling; second best, 5 sovs., James Tweedie, Nether Abington, Lanarkshire.

Best pen of five ewes, 8 sovs., Malcolm Coubrough, High Craigton, New Kilpatrick; second best, 4 sovs., John Lorne Stewart, Stronvar, Campbellton.

Best pen of five young ewes, 5 sovs., John Lorne Stewart; second best, 3 sovs., Captain Hew Ferguson Kennedy, of Bennand, Girvan.

Best pen of five gimmers, 5 sovs., James Brydon, Kinnelhead, Moffat; second best, 3 sovs., Malcolm Coubrough, High Craigton, New Kilpatrick.

SOUTHDOWN BREED.

The best tup, 10 sovs., and best pair of shearing tups, 10 sovs.; Duke of Richmond.

Best pen of five ewes, 8 sovs., and best pen of five shearing ewes, 5 sovs.; Hugh Watson, Keillor.

SWINE.

Best boar, large breed, 5 sovs., George Hay Plummer, Melville, Dalkeith; second best, 3 sovs., Edwin Addison, Headingley Hill, Leeds.

Best boar, small breed, 5 sovs., Jonathan Brown, Westward, Wigton, Cumberland; second best, 3 sovs., Captain Russell Elliott, Easter Langlee, Melrose.

Best sow, large breed, 4 sovs., John Jardine, Ruecastle, Jedburgh; second best, 2 sovs., Colin Campbell, of Colgrain, Helensburgh.

Best sow, small breed, 4 sovs., Jonathan Brown, Westward, Wigton, Cumberland; second best, 2 sovs., Marchioness of Lothian, Newbattle, Dalkeith.

Best pen of three pigs, 4 sovs., Thomas Bowman, Hallhill, Baillieston, Glasgow; second best, 2 sovs., Alexander W. Buttery, Monkland, Airdrie.

EXTRA STOCK.

The Judges have commended the following animals, for which premiums will afterwards be adjudged by the Directors.

CATTLE.

To Thomas Gaffikin, Belfast

James Young, Handaxwood, Whitburn

Hugh Watson, Keillor

Thomas Carnegie, of Craigo, Montrose

David Walsh, Tillytoghills, Fettercairn

Sir John McNeill, Granton House, Edinburgh

Allan Pollok, yr. of Faside

William Webster, Dail

Andrew Clark, Airdrie, Crail, and to

M. Fowler, sen., Stanmore, Middlesex.

HORSES.

To Mr. Campbell, of Edriline, Lochgiphead
Robert Mackay, Dalkeith
Robert Walker, Lethamhill, Glasgow, and to
Robert Barr, Burntongue, Dalry, Ayr.

SHEEP.

To Mr. Thomas Cockburn, Sisterpath, Dunse
Thos. Dickinson, Magdalene Hall, St. Boswells
Robert Paterson, of Birthwood, Biggar, and to
John Gibson, Woolmet, Edinburgh.

DAIRY PRODUCE.

BUTTER.

The best sample (not less than 14lb.) of butter cured in 1850, 5 sovs., Mrs. Aitkenhead, Byres Farm, Pollokshaws, Renfrew; and the second best, 3 sovs., Mrs. Aitkenhead.

Best sample (not less than 14lb.) of powdered butter, cured for immediate use, 5 sovs., James Gray, Blawarthill, Renfrew; second best, 3 sovs., Robert Muirhead, Castlehill, Lanark.

Best sample of fresh butter, of three rolls, of $\frac{1}{4}$ lb. weight each, 5 sovs., David Calder, Millersneuk, Kirkintilloch; second best, 3 sovs., John Clark, Flender Farm, Busby, Renfrew.

CHEESE.

Best couple of cheeses, made from sweet or full milk in 1850, 5 sovs., Thomas Allan, Whin Knowe, Strathaven; second best, 3 sovs., Thomas Morton, Haggis, Glassford, Lanark.

Best couple of cheeses, made from skimmed milk in 1850, 5 sovs., Wm. Muir, Hardington Mains, Biggar; second best, 3 sovs., Wm. Muir.

Best imitation of any known description of English cheese, 5 sovs., D. Cunningham, Chapelton, West Kilbride; second best, 3 sovs., James M'Adam, Ingleston of Borgue, Kirkcudbright.

IMPLEMENTS AND MACHINES.

Best two-horse plough for general purposes, 2 sovs.; best lea or seed furrow plough, 2 sovs.; best double mould board plough for forming drills, 2 sovs.; best plough or other machine for filling in or returning the earth upon drains, 2 sovs.; and best one row bean sowing machine, 1 sov., George Ponton, Groughfoot, Linlithgow.

Best subsoil plough, for moor and stony land, requiring the draught of three or more horses, 2 sovs.; best turnip cutter for cattle, 2 sovs.; best Norwegian harrow, 3 sovs.; and best sheep fodder rack in iron, 2 sovs., James Kirkwood, Tranent.

Best light subsoil plough, capable of being worked by two horses, 3 sovs., James Wilkie and Co., Uddingston, Glasgow.

Best two horse grubber or cultivator, working on the flat, 4 sovs., Hugh Cowan, Corstorphine, Edinburgh.

Best one horse drill grubber, for green crops, 2 sovs., Archibald France, Stirling.

Best consolidating land roller, 3 sovs.; best oat and bean bruiser for hand or power, 3 sovs.; best steaming apparatus for preparing the food of horses and cattle, 4 sovs.; best weighing machine, adapted to indicate with accuracy the weight of cattle and sheep, as well as all other products of the farm, from 1 lb. to 2 tons, 5 sovs.; and best set of horse power gearing, economically adapted to machines for making drain tiles and pipes, or for other purposes, as churning, &c., 3 sovs., A. and W. Smith and Co., Paisley.

Best and most economical pulverizing land roller, 3 sovs.; best set of harrows, 2 sovs.; best dry manure distributing machine, drill or in broadcast, 3 sovs.; the best and most sim-

ple pump, or other machine, suited for withdrawing the liquid from urine tanks, 2 sovs.; the best and most economical root washer, 2 sovs.; best light spring cart for farm or other purposes, 3 sovs.; best hay tedding machine, 3 sovs.; best horse stable hay rake, 2 sovs.; and best thrashing machine, on the principles chiefly employed in England, whether worked by steam or horse-power, 10 sovs., William Crosskill, Beverley.

The best set of swing trees or draught bars, 1 sov., William Gray, Stane, Whitbura.

The best liquid manure distributing machine, 5 sovs., Thos. Chandler, Aldbourne, Hungerford, Berks.

The best chaff cutter, 3 sovs.; the best turnip cutter for sheep, 2 sovs.; the best linseed bruiser, for hand or power, 2 sovs.; and the best cheese press, 1 sov., Richmond and Chandler, Salford, Manchester.

The best corn and hay or harvest cart, 3 sovs.; best dressing fan or winnower for grain, 4 sovs.; and best set of equalizing swing-trees or draught bars for 3 horses, 1 sov., to Robert Law, Shettleston, Glasgow.

Best broadcast sowing machine for grain or grass seeds, 3 sovs., James Watt, Biggar.

Best drill sowing machine for grain, 3 sovs., William and James Hunter, Samuelston, Haddington.

Best sowing machine for turnips with manure, 3 sovs., Sir John Stuart Forbes, of Fettercairn, Bart.

Best one-horse farm cart, 3 sovs.; best churn, worked by hand, 2 sovs.; and best churn worked by power, 3 sovs., Robert Gray and Sons, Uddingston, Glasgow.

Best and most convenient set of stack pillars with framework, 2 sovs.; best and most economical field gate, constructed entirely of iron, and on correct principles, 2 sovs.; best and most economical field gate of any other construction on correct principles, 2 sovs.; and best six iron hurdles, suited to form a secure fence for cattle, 2 sovs., Charles D. Young and Co., Edinburgh.

The most important improvement on any of the individual parts of the Scotch thrashing machine, exhibited at full size, 10 sovs., William Lorimer, Crosshill, Maybole.

Best thrashing machine, suitable for small farms, constructed on the Scotch principle, with cast-iron framework and casing, and in a portable form, with horse-power machinery, 10 sovs., M'Cartney and Drummond, Cumnock.

Best barley hummeller, adapted for attachment to a thrashing machine, 3 sovs., David Cassels, Newton Mearns.

Best machine for making drain tiles and pipes from clay, 5 sovs., William Brodie, Airdrie.

Best machine for separating from clay stones and other extraneous matter, and for bringing it into the fittest state for the manufacture of drain tiles and pipes, 5 sovs., Robert Steele, Bo'ness, Linlithgow.

Best apparatus or machine for cutting the ends of drain pipes, so as to form a continuous and permanent connexion without the use of collars, 3 sovs., Jas. Wallace, manager Turiff Tile Works, Turiff.

Best collection of draft tiles and pipes, manufactured for field drainage, 2 sovs., James Craig and Co., Paisley.

Best collection of glazed socketed pipes adapted for the conveyance of water, together with specification and specimen of the cement used in connecting them, 2 sovs., Ferguson, Miller, and Co., Glasgow.

Best set of draining tools for cutting field drains, 2 sovs.; and the best set of tools for cutting open drains in hill pastures, 2 sovs., Wm. Cadell, Sons, and Co., Cramond.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(From the Morning Chronicle.)

CONDITION OF THE LABOURER IN DORSET.

LETTER XII.

Dorset has a bad name as regards the condition of the labourer. Whether or not it deserves its unenviable pre-eminence in this respect, the reader may be able to judge from what follows.

In prosecuting my inquiries in this county, I selected three different centres of observation—

Wareham, Blandford, and Shaftesbury. I chose the first, because the district around it not being exclusively agricultural, wages are materially affected by the presence of other occupations which give rise to a considerable demand for labour. The second I took as being the centre of a

purely agricultural region, where the rural labourer might be seen in what may be regarded as his normal condition; and the third as being not only contiguous to an agricultural district, but also on the borders of Wiltshire, with which county I was anxious to compare Dorset, as I have frequently been told that "bad as we are here, we are not quite so bad as they are in Wilts."

The district extending for many miles around Wareham is of a very varied character. To the eastward it has the large and irregular sheet of water known as Poole Harbour, whilst in all other directions it is surrounded with heath. In some directions the waste extends much further than in others. Westward, towards Dorchester, and along the line of railway, it is only here and there broken by arable tracts. Towards Bere, it extends in a north-westerly direction to a depth of fully five miles. Due north, on the way to Blandford, it is sooner penetrated and left behind; whilst towards Wimborne, in the north-east, it extends, with but little interruption, to the borders of the county. Going to the south from Wareham, the heath, which is here very boggy, extends nearly to Corfe Castle, a distance of about four miles—the belt of land intervening between the latter place and the sea being more or less arable, and in some places highly cultivated. Taking a radius of about eight miles, and describing therewith a circle round Wareham as a centre, the greater portion of the tract embraced within the circumference would be water and waste.

In a district poor as this is in an agricultural point of view, it might naturally be supposed that wages were low, and that the condition of the labourer was wretched in an equal degree. But such is not the case, wages in the district in question being comparatively high, and the physical condition of the labourer, in some respects, superior to what it is in the more purely agricultural tracts of the county. This is accounted for by the fact that there are other outlets for labour than the farms in the neighbourhood of Wareham.

The chief of these is to be found in the clay pits which lie immediately south of the town. These give rise to some trade on the Frome, between Wareham and Poole, affording occupation to a considerable number of bargemen. There are also the stone quarries at Swanage, which act as an outlet, whilst numbers find employment in connection with the improvements which are being effected by Lord Eldon in the neighbourhood of Encombe.

The largest clay works in the kingdom are to be found here. They are in the hands of three different firms, the chief of which is that of the Messrs. Pike, and they give employment to from four to five hundred men. The clay extracted is of a totally different character from that produced by the China clay pits between Bodmin and St. Austle, in Cornwall. It is coarse as compared with that, being such as is used in the manufacture of common stoneware. It is not worked previously to exportation to the potteries, being sent thither in bulk, just as it is extracted from the pits. The property on which the clay veins are found belongs chiefly to Lord Rivers and Mr. Calcraft, formerly member for the county. When a vein of clay is discovered

the parties wishing to work it obtain a lease of the ground from the proprietor, to whom a certain rent is guaranteed. In consideration of this rent, however, the lessees are not permitted to extract beyond a certain maximum amount of clay. If they do extract more during the year, the land is entitled to a tribute of 2s. per ton upon the excess.

The lease being obtained, the first thing to be done towards the working of the vein is the removal of the "heading"—which designation is applied to the superincumbent stratum of earth or gravel. This is done by a "party" of excavators, who engage to remove it at so much per cubic yard. Sometimes the clay is but a few feet beneath the surface; at others it may be upwards of a hundred. Other things being equal, the deeper it is, the adventure is of course all the less profitable. Some veins which are near the surface lie parallel to it, and are easily worked. Others, although near the surface at one end, dip so rapidly that the expense of working them causes them sometimes to be abandoned before they are exhausted.

The heading being removed, the vein is ready for working, which is also done by parties, each party consisting of six, seven, eight, or more individuals. They worked together, their engagement being to extract the clay at so much per cubic yard. They can thus earn less or more during the week, according to their diligence and industry. The work is such as to require those engaging in it to be strong and healthy men. The clay is, as it were, quarried out of the pits. The instrument chiefly employed to detach it in blocks from the mass is a narrow but heavy spade, weighing from 17lbs. to 20lbs. The men stand almost erect as they strike the spade into the clay, which they thus cut into strips about a foot wide to the depth of the blade of the spade. They then cut it transversely, the transverse cuts being about a foot and a half apart; after which the different blocks thus formed are easily detached, one after another, from the mass. The process of cutting is facilitated by water being poured into the cuts, as the men proceed with them, the object of which is simply to ease the work, by preventing the spade from sticking firmly in the clay when forcibly driven into it. The water is supplied by boys, who earn each about half the wages of a man. The blocks, when detached, are put into railway trucks, in which they are dragged, by means of an inclined plane, worked by horse-power, out of the pits. They are then despatched in the same trucks to the port of Wareham, three miles distant, by railway—the trucks descending the line, which has a regular declination towards the harbour, by their own weight. On reaching the port they are shipped in barges to Poole, where again they are shipped in larger vessels for Liverpool. When the clay is good and the vein deep, the cheapest process of working is by mining it. A perpendicular shaft is driven until the clay is reached, when the vein is worked in what are called "lanes." In Cornwall they would be termed levels. It is by the weight, and not the bulk, that the miners are paid—receiving so much a ton for what they raise. Their work being of a more dangerous description, their earnings are generally higher than those of the men engaged in the pits.

The nature of the arrangement between them is such, that beyond seeing that the work is not wholly neglected, the employers exercise little or no control over the men employed. They lay down some general rules which must be observed by all, such as that no liquor shall be taken to the works, for the infraction of which they invariably discharge the transgressor. But the men may choose their own hours of working, provided they supply their employers with sufficient produce to meet the demand upon them. I have known work in the mines suspended at two o'clock. The wages are all paid weekly, the accounts being kept with the different parties at work. According to the quantity of work done, the sum earned is handed over to the head of the party, who divides it with his comrades in proportion to the amount of work done by each. As each works for all, and all for each, they keep a sharp look-out upon each other when actually at work. The proportion which each is to receive is, therefore, entirely regulated by the time for which he has been at work during the week. If he has been absent for a day, half a day, or two days, a deduction *pro tanto* is made from his share of the common earnings. I was very courteously permitted by Messrs. Pike to inspect their books, and found that, whilst the miners generally earned from a pound to a guinea a week, the pitmen averaged sometimes from 3s. to 3s. 6d., and at others from 2s. 6d. to 3s. per day. The average earnings of the latter were from 2s. 6d. to 2s. 9d. day. It is obvious how so large a demand for a particular species of labour at so high a price must affect the general rate of wages in the district.

To the stone-works at Swanage I shall have occasion hereafter to refer. These, together with Lord Eldon's improvements, have also a favourable effect upon wages in the neighbourhood of Wareham. The latter have not benefited the district as much as they might have done, inasmuch as they are being partly affected by imported labour. They have, nevertheless, afforded considerable employment to the resident population in the neighbourhood of Encombe, the only drawback to which is, that it has been to some extent casual instead of continuous. The works are in the hands of contractors, who, of course, look less to the employment of the labour of the district than to procuring the labour most adapted to their purposes.

The bargemen employed in carrying the clay from Wareham to Poole get 1s. a ton for the quantity carried. They have not steady employment, but their wages, when they earn them, are good, and exhibit a comparatively high average throughout the year.

It is by the demand for labour to which these different occupations give rise, that the value of agricultural labour is favourably affected in the neighbourhood of Wareham. But even here the wages of the farm-labourer are, after all, as already said, only comparatively high. Except to carters, who receive 9s., the *maximum* paid is only 8s. a week. With this, some of them, but not all, have a free house. In most cases they have their fuel in addition. This consists of turf, which they themselves cut, but which is carted to their houses by the farmers, who claim the ashes as sufficient com-

pensation for their trouble, which is very little, seeing that the heath where the turf is cut is generally hard by the labourer's hut. I regret to say that this is the most favourable report which I have to make as regards the wages and condition of the day-labourer on the farm in Dorset. Standing on this, then, as the highest point in the scene, the reader will have to contemplate a dreary level of misery and privation around him.

In inquiring into the condition of the labourer in the neighbourhood of Wareham, I first directed my attention to the district lying immediately south of the town, known as the Isle of Purbeck. This district varies much in its surface and general character, some of it being high and fertile, and other portions low, heathy, and irreclaimable. Close to the town, and between it and the arm of the sea into which the Frome discharges itself, a portion of the low-lying lands has been reclaimed from the waste, and now extends in one dreary and monotonous level of damp meadow land. The greater proportion of its surface is but little elevated above high water mark; and during the night it is generally overspread with noxious malaria, which commences to rise from it with the setting of almost every sun. Yet in this ungenial spot are several cottages, containing in all nearly 100 human beings. I examined several of them, and will describe a few, taking their inmates as I found them, bargemen, claypit men, and farm labourers together.

The first that I visited was a cottage, occupied by a family of the name of Galton. The family consists of six persons—the father and mother, a son, and two daughters, and a grandchild, the illegitimate offspring of one of the daughters. When I entered, the only persons at home were the mother and the younger daughter. The mother informed me that her husband had steady work from Farmer Boyt, at 8s. a week, with a cottage free, and turf carried in. On the whole, the wages might be taken as amounting to about 9s. 6d. a week. They kept a pig which they intended to kill at Christmas, and to which they looked as the only animal food which they were likely to have for the season. An open ditch, which served as a sluggish drain for the meadow, after touching one of the back corners of the house, which was a thatched mud hut, turned at a right angle, and extended along the back of it, right under the wall. The character of this ditch was indicated by the vegetation which thickly incrusts its stagnant contents. A little in front was another ditch, filthy in the extreme, though not quite so bad as the other. In front of the house was an ash-heap, where it would remain until the farmer chose to carry it away. The pigstye was behind, leaning against the wall of the fuel-house, which formed part of the building. So low was the hovel situated, that whenever it rained heavily it was completely inundated. Some time ago, after a heavy thunder-storm, the intrusive waters took possession of the whole floor, invaded the cupboard of the dresser, and rose, in an inner room, "half way up the legs of the bed." It was a long time afterwards ere the house got dry—indeed, it was not thoroughly so ere it was again flooded. It was about three years since the family had entered the house. They had all had ague shortly after doing

so. The youngest daughter, the one then at home, had never been rid of it. Her sunken cheek, languid motions, and jaundiced complexion, all but too well attested the presence of the disease. The smells, I was further told, were sometimes very bad, but they were thankful that they were neither so numerous nor so offensive as those to which they had been accustomed at Newton, some miles off, where they formerly lived. There they had occupied a house from which the ague was never absent. Such was the domicile which they got rent free, instead of an extra shilling in the shape of money-wages. But had they had two extra shillings, the poor creatures knew not where to get a better house, for there was none vacant in the district.

My next visit was to a hut but a few yards removed from that just described. It was one of a row consisting of four, being all thatched, and the crumbling walls constructed of mud and brick. In front of the door was a small close porch entered from the side. From this porch I stepped into the hut, in doing which I had to descend a step. The situation was as low and damp as that of the other cottage; nor was the house improved in this respect by the step down which had to be taken to gain the floor. There were but two rooms, one below and one above, which, as usual, served as the sleeping apartment. The lower room was dingy in the extreme, its dimensions scarcely exceeding 12 feet by 10. The floor was composed of small, rough, and irregular flags, and so close were the two floors together, that I had barely room to stand erect, without my hat, between the beams supporting the upper one. The tenant's name was Stockley, a common name in these parts. He was six feet two inches in height, and had never stood erect in his own house. There was not a corner of it in which he could do so. All the wood-work was blackened with smoke, and clammy with moisture. The wall was bulging in on all sides, and seemed scarcely capable of supporting the crazy roof. The family consisted of seven—viz., the father and mother, and five children, all boys. The eldest boy was 16 years of age, and worked with Farmer Boyt at 3s. a week. The second son was earning 4s. a week at the clay-pits. Both of them could read a little, but the second only could write—that is to say, he could write his own name. They all slept in the apartment upstairs. It contained two bedsteads, in addition to which a bed was made on the floor. One corner of the sleeping-room had to be avoided on account of the floor having given way; it hung partly down into the lower room, so that the weight of a child almost would have brought it down altogether. About the middle of the floor the rents were so large that I could see almost the whole of the sleeping-room through them. But the most extraordinary feature connected with this house was the provision made by the inmates for baling the water out when the hut happened to be flooded by it. For this purpose, three of the flags were kept movable. I desired them to be lifted, and on their being so, discovered under each a large hole scooped out in the clay, each hole capable of containing about a gallon. When the water began to rise on the floor, which was not unfrequently the case, to a height which threatened to extinguish the fire, these flags

were raised, and the intrusive flood was drained into the holes in question. From these it was easily baled out by means of a tin dish. But for this device the floor would be frequently several inches under water. When the water subsided the flags were replaced, not to be removed again until the next heavy rain should be followed by a tide within the dwelling. One of the three holes which was under the only table in the house was deeper than the others, and had always more or less water in it. But for this, the floor would never be dry. It was very damp when I saw it, but Mrs. Stockley called it dry. For this wretched den no less than £3 a year are paid as rent to Mr. Denis Brown, of Wareham. There is much, however, which might be done to it to render it more comfortable than it is. As it now stands, the whole fabric is scarcely worth one year's rent paid for it. I inquired why the family stayed in such a hole, and was informed that they had no alternative but to do so, as it was the only house they could get "convenient to their work." The ague was seldom out of it. Both father and mother had it on first taking the house, and not a year passed without some of the children being for a time stricken down by it. The youngest was just recovering from a severe attack of smallpox. The mother was still annually attacked by premonitory symptoms of ague; but she was now accustomed to the disease, and stifled it at once by the use of active remedies. The other three houses of the row were somewhat larger and drier than this; but they, too, were damp, dark, filthy, and unwholesome. The whole row was not much more than fifty feet long—it contained in all eight rooms, and accommodated twenty-three people. They all slept in the roof of their respective domiciles, so that if the whole roof were thrown into one elongated chamber, and the occupants of the four houses lay side by side across the floor, each would have a strip of little more than two feet wide; in other words, they could scarcely lie without touching each other. Distributed as they were, each sleeping room averaged about six occupants.

I found most of the denizens of this marshy and unwholesome plain in receipt of very good wages. But few of them were farm-labourers, the majority being either bargemen or clay-pit workers. Stockley wrought in the pit, and his earnings averaged about 14s. a week. Two of his sons, as already shown, earned between them 7s., so that the united earnings of the family amounted to a guinea a week. Others, both bargemen and claymen, were in receipt of equally high earnings, and yet they did not appear to be a whit more comfortable than the Galton family, whose whole support was the 8s. a week earned on the farm. Mrs. Stockley complained that she and her family seldom tasted meat, and so did Mrs. Galton. The Stockleys paid rent, it is true, whilst the Galtons did not. But after deducting their rent, the earnings of the Stockleys were more than double those of the Galtons, whilst there was but one more child in the family. If the seven Stockleys were miserable on a guinea a week what must the six Galtons be on 8s.? I confess it puzzled me at first to ascertain how it was that the one could not make 2s. go farther than the other made 1s. go. I requested Mrs. Stockley to inform

me how the weekly earnings were spent. She soon disposed of the 7s. earned by the boys, by saying that they consumed all they got, and frequently more than they got. They worked hard, and fared, at least, as the men did. There was then the cost of their clothes and their shoes, of which they had but a scanty stock, it was true, but still more than would have fallen to their lot had they been earning nothing for themselves. But supposing the boys to be self-subsisting and no more, there were still the father's earnings, 14s., for the maintenance of the remaining five of the family. Taking the rent out of this, it would leave about 12s. 9d. as the fund for the support of five. But still for the support of the six Galtons there were but 8s. a week; and yet the Galtons did not seem to be more wretched than their neighbours. The secret by-and-by came out. The Galtons had 8s. a week steadily throughout the year, whilst the greater incomings of the Stockleys were casual and fitful. Stockley's employment was tolerably constant, but Galton's was steady and uninterrupted. The consequence was, that Mrs. Galton could, from week to week, take the exact measure of her means, and manage accordingly. Not so with Mrs. Stockley. The earnings of one week were no necessary indication of what those of the next week might be. In both cases the earnings of each week went as they came. But in the one case each week brought with it the same measure of comforts as the preceding one; whereas in the other, the comparative abundance of one week might be followed by the privation of the next.

"The working people can't stand an uncertainty," said a friend to me, who drew my attention to this point as intimately connected with the general condition of the labourer. Except in the case of purely agricultural labour, casual employment is generally accompanied by high wages. A man thus casually employed may average more per week throughout the year than the man having steady work at low wages. But it is generally found that the former is frequently worse off than the latter. Nothing can better illustrate this than the case of the bargemen who ply their craft between Wareham and Poole. When engaged, they receive very good remuneration for their work. The barges do not belong to them, but they work them at so much per ton of goods actually carried. Their employment is not very constant, but they make good wages when they are engaged. Yet there is no set of men in the district more miserably off as a class than these very men. The Messrs. Pike have recently employed thirteen of them in manning a few barges connected with their clay work. Since the beginning of the year these thirteen have earned amongst them £700. One of them who was in a better situation than the rest, and whose earnings were frequently considerably over £1 per week, was some time ago detained by illness from his work. He had not been laid up a week ere he sent a begging letter to his employers. And so with most of them. If they are out of work for a few days, they wend their way to the union for relief. Their superior earnings avail them not, coming fitfully as they do—even though they come with sufficient frequency to give a comparatively high average throughout the year.

None are more convinced than the poor themselves of the evils consequent upon uncertain employment and irregular wages. They are aware of their want of self-control, and some of them, more prudent than the rest, take measures to prevent their defect in this respect from being injurious to their families. Some of them who drink beer at their work, prefer buying it in small quantities, as they require it, to the cheaper course of laying in a large quantity at a time. Their reason for so doing is, that if they adopted the latter course, what they laid in would all be consumed at once.

The point to which I next bent my course was the village of Corfe Castle, once a parliamentary borough, returning two members to parliament. It lies about four miles to the south of Wareham, immediately beyond the clay-pits, and on the borders of the agricultural district stretching between them and the sea. On my way thither I passed through the village of Stoborough, about half a mile from Wareham. To do justice to the filthy aggregate of human dwellings passing under that name, is scarcely possible. There are hardly half-a-dozen houses in it fit to be inhabited, and yet almost every hovel swarms with more than its proper complement of inmates. Here, too, you have different scales of wages giving rise to but slight differences in condition. The street on either side is one line of dung and ash-heaps. The cottages which seem to be centuries old have a dangerous and tumble-down look about them; and indeed most of them would by this time have been among the things that were, but for the stout brick butresses which have recently been built against the walls for their support. There is a sink with a light iron grating over it before most of the doors, from which odours ascend in moist or hot weather of no very desirable kind. Notwithstanding this, there is much stagnant surface-water generally in the street. At the upper end of the village, the houses seem actually rotten with age. Before one is a filthy duck pond full of slime and garbage. A little way further up is a horse-pond, in which turnips are sometimes washed before being given to cattle. When I was passing, a boy was paddling in the water in search of the turnip-tops, which he was to take home to be cooked and eaten.

About two miles beyond Stoborough my attention was attracted by a cottage which stood a little off the road to the right. On examining it I found it inhabited by a family of the name of Keats. It had recently been a stable, from which, by means of a little patching, it had been converted into a house. The walls were of mud, here and there strengthened, where they had been giving way, by patches of brickwork. The family consisted of six persons. There were two rooms on the same floor, there being no room above. The rooms were so low that here, again, I was puzzled to stand erect. The ceiling of the common room was a perfect wreck. It had formerly consisted of a layer of coarse plaster spread over reeds by way of laths, which were attached to the slender beams which stretched from wall to wall. The plaster was in places gone, and so were the reeds, so that at different points the whole anatomy of the ceiling was exposed. The

whole, too, instead of stretching straight across, hung downwards, like so much loose canvas suspended over head. Off from this room was the bed-room. It was about 12 feet long by 8 feet wide, yet it contained three beds, and accommodated six people. One of them was a girl of twenty-one, another a boy of sixteen. For this house a rent of £1 1s. is paid. It is on the property of Mr. W. Bankes, which is at present under the management of Mr. George Bankes, M.P. for Dorset.

Leaving this, I proceeded direct to Corfe. The old castle completely overlooks the town from its isolated, and once commanding, position. The grim old pile is rich in historic associations. During the "great rebellion" it was heroically defended for some time by Lady Bankes against the hosts of Cromwell. The name of Bankes is yet associated with many objects in its neighbourhood; prominent amongst them is an old almshouse, which is at the entrance of the town, and at the very base of the castle. It is no longer an almshouse, being now filled with a colony of poor, wretched, and squalid-looking tenants. The house, which occupies two sides of a court, is of some size, and it contains from seventy to a hundred individuals. I believe that rent is paid for every room occupied in the house. There is a stable-yard in front of the court which it faces. It is also, as I was told, under the management of Mr. Bankes. A short time before I got there, a large heap of dung had been deposited close to the gate leading into the open court. It was still in a state of reeking fermentation, and the smell to which it gave rise was offensive in the last degree. When I entered the court I found the whole population assembled, and bordering on mutiny. The dung-heap in question was the grievance which had excited their ire. They were quite sure it would bring the cholera amongst them, if anything would ever bring it; whilst some of them assailed me as if I had put it there, although I was perfectly ignorant as to who was the delinquent. I vainly endeavoured to obtain information in the town as to how this charity had become transformed into private property.

Corfe is a small place, but the great proportion of the houses which it contains are of a very miserable description. This is particularly the case in the lanes and outskirts of the town. I visited several of the worst description. One of the first of these was inhabited by a family of the name of Grant. There were twelve of them in the house. They had a good deal of room below, but only two sleeping-rooms above. In these were four beds; and it was with no little satisfaction that Mrs. Grant told me that they did not "sleep thicker than three in a bed." The family was then suffering considerably, owing to the husband and father being out of employment.

The next which I inspected was occupied by a family of the name of Brett. It had four rooms, two below and two above. It was very low, and the upper rooms were wholly in the roof. One of the lower rooms would, as regards size, have afforded tolerable accommodation to a small family. The other was a mere closet, the floor of which was

almost wholly covered by the bed which occupied it. A child lay sick in the miserable and mouldy chamber. I ascended to the upper chambers. They had been plastered and whitewashed many years ago, but were then wholly out of repair. The roof rose on either side from the very floor, so that the only perpendicular walls were at the two ends, if walls can be called so which have not known the perpendicular for years. Had the two rooms been thrown into one, they would have afforded available room more than 16 feet long, and 10 wide. In the centre of the room I could stand erect, but nowhere else. Indeed, they virtually formed but one room, the thin deal partition between them not rising to the roof, and the door through it being too small to fill the doorway. In several places whole yards of the lath and plaster seemed to be hanging to the rafters only by hairs. At the farthest end of the inner room I touched the plaster thus situated with my stick. Down instantly came a large quantity of black dust, which formed a tolerably sized heap upon the floor. I touched it in another place with a similar result, the rotten thatch and clay falling, in this instance, on one of the beds. I was told that when the wind blew very hard and shook the house they could sometimes pick up near a "barrow full" of this debris in the room. When it was wet, too, for any length of time, the rain percolated through the rotten thatch and yawning plaster. In these two rooms, or rather in this one room, were four beds, which were occupied by twelve people. The whole number inhabiting this wretched tenement was fourteen. There were two families in the house—two sisters with their husbands and children. These made thirteen; the fourteenth being the brother of the two sisters, a man tolerably advanced in life. One of the sisters occupied with her husband the small room below. The other, with her husband and six children, together with the five children of her sister and brother—that is to say, the uncle of all the children—occupied the upper room, or rooms, if they could be called so. Several of the children were grown up, and one, who was then in the house, was a girl of seventeen. In winter, notwithstanding the number occupying it, the upper room was often bitterly cold, and no wonder, for one of the end walls seemed to have parted company with the roof, and leant outwards considerably. In summer, again, it was perfectly stifling, the small windows not sufficing to ventilate the room. Had the walls been perpendicular on all sides, they thought that they might get on, but the space being contracted, from being entirely in the roof, they were sometimes nearly choked "with their own breaths," as they said. The rent paid for this hovel was 1s. a week. I asked them why they did not seek for a better house? but was told that they could not get one for love or money. The two sisters had been bred in the house themselves. They were also married there on the same day, and for want of cottage room in the neighbourhood the two married couples had to settle themselves in the mother's house. There they have since remained, and have between them reared up in the same place no less than twenty-two children! "Yes," said one of them, with considerable emotion, "I have brought up eleven, and so has my sister, and ne'er

a fire-place have we had but that one," pointing to the huge but cheerless hearth. They could scarcely speak with patience of the den inhabited by them, to which they applied the most uncompimentary epithets. I inquired if they would be willing to pay more rent for better accommodation. "I would live on a dry crust to be able to do it," said the one. "That we would, and gladly," echoed the other. I then ascertained that a promise had lately been made them that the house should be pulled down and a new one erected in its place, which they were to have. But it appeared that this project had been abandoned, and that they were then promised that the house would be repaired next spring. It seemed, however, that the agent had just informed them that it could stand for two or three years as it was; which was very problematical to say the least of it. But for a cow-house in the shape of a "lean-to," one of the end walls would have been down long ago. The inmates complained bitterly of the unsteadiness of their work.

This house is, like many others near it, the property of the Rev. Mr. Bond, rector of the neighbouring parish of Steeple. Of the reverend gentleman I heard none express themselves but in terms of the highest respect. Testimony to his humanity and kindheartedness was universally and ungrudgingly given. Surely he cannot know the state in which some of his tenants live.

I visited another house of his—the last proceeding southwards of the town. It was a long, low building situated by the roadside, on a slight declivity, and had formerly been a public-house, under the biblical designation of "Noah's Ark." The upper end was the fuel-house, the lower, which was about two-thirds of the whole, having been the "public." The whole was now let to a man of the name of Gover, who had divided the lower part into two tenements, one of which he occupied himself, having sublet the other to a family of the name of Hood. This family possessed only a narrow strip of the habitable part of the house, in the end adjoining the fuel-house. From being higher than the rest, the floor of the fuel-house had always been considerably elevated above that of the cottage. It is through the fuel house that the Hoods have access to the strip which has been partitioned off for them. They would have to descend from the fuel-house into it, were it not that a passage way has been cut through the elevated flag floor of the fuel-house—which passage way is brought down to the level of the floor of the family room. About two-thirds of the elevated floor of the fuel-house still remains as it was, forming a kind of platform in the end of it farthest from the habitable room. That room is but 14 feet long by 7 wide. There is no room whatever up stairs. This room has a kind of ceiling about six feet high, but the fuel-house is covered in simply by the rafters and thatch. The family, if I recollect aright, consisted of nine—the husband and wife and six children, and the wife's mother. So contracted was the area of their only room, that when they were all assembled each had a little more than a square yard for his or her share. At one corner of the room was a deep recess partly constructed out of what had formerly been a large fire-place, and divided from the room by a tattered

curtain. This recess was completely filled by two large beds, in which slept the father and mother and five of the children. A close unwholesome smell proceeded from this place, which was also swarming with vermin. On inquiring where the grandmother and the other child slept, I was directed to the fuel-house. I searched for the sleeping-place of the aged woman, and was horrified on discovering it. At one corner of the fuel house, and on the elevated part of the floor, two rough walls were built of stone, which, with the two walls of the house, formed the sides of the apartment. The two walls built inside were not more than five feet high. Over them was put a hurdle, and over that again a piece of canvas to keep the dust out, for the rotten thatch kept dropping from above. In one of the walls of the fuel-house a hole was perforated about eight inches high and five wide, which formed a window to the chamber. It had no glass, a few splinters of wood being nailed across by way of a case-ment. There was a small window-shutter, which swung upon a hinge inside, which covered up about two-thirds of the hole. The remaining third was kept open night and day for ventilation, and of course gave free admission to the cold and the elements. The dimensions of this crib were six feet long, five feet wide, and five feet high. The bed which lay across it occupied fully two-thirds of its space. Such was the dormitory of a woman on the eve of completing her 76th year. Her eldest grandchild, a girl of about 11, slept with her. I asked the poor woman if she was not sometimes very cold. "I be freezing often," was her answer. "I have lived very long to die in such a place," she continued. One may any day see at the London Docks packing-cases quite as large. Indeed, its position was like that of a large packing-case standing in the corner of a room. A friend who was with me, likened it to a mouse-trap. For this house with its appurtenances, two pounds a year are paid, by way of rent, to Gover, Mr. Bond's lessee. The inmates stayed in the house because they could not do better. If they left it, they had no place to go to, although they were willing to make every possible exertion to pay even a higher rent for better accommodation, if it could be procured. It was with difficulty they could meet their present rent, for the father had but uncertain employment, and had then been out of work for four consecutive days. Their food, for weeks past, had been bread and "sweets"—garden vegetables, chiefly turnips and parsnips, going by the latter name.

Wherever I went, I found the uncertainty of work and the want of cottage accommodation the two great subjects of complaint. I was told by some of the more respectable people in Corfe that if there were twenty new cottages built in the town they would be readily occupied. So great is the want of room, that many of the labourers themselves would go to the expense of building if the opportunity of so doing were given them. To some extent this has been done, and the mode in which they have taken advantage of it shows that not only is more room wanted, but that their idea of physical comfort rises considerably above the character of the accommodation now at their command. On

a heath between Corfe and Wareham, belonging to Mr. Banks, small plots of ground averaging two acres each have been leased on three lives to some of the labourers. For these they pay at the rate of 5s. 6d. per acre. On each plot a house is raised at the labourer's own expense. I was curious to see these houses, and proceeded to examine them. I found them substantially built of mud, a compound of sand and clay, each being two stories high, so that the upper rooms were not wholly in the roof. There are generally four rooms to a house, the floors of the lower rooms being, in some cases boarded, a great improvement upon the clay, the brick, or the flag. One at least of these rooms, too, is so comfortable that it can be used if necessary as a bedroom, so that the family can have the advantage of three bedrooms, which is the least each cottage should contain. The rooms are lofty, likewise, as compared with the huts described. Such is the house which, together with two acres of land, a man may have for 11s. a year. True there is the interest on the outlay for the house to be considered. Giving his own labour during his spare time to building the shell, the woodwork and other requirements will cost the labourer from £30 to £40. Allowing 5 per cent. for the greater sum, he will have his house and land for about £2 10s. a year, a less sum than many pay for the merest dens without any land at all. One of the chief advantages of putting the labourer in this position is the degree of self-respect with which it invests him. Occupying what is virtually his own house, he is a comparatively independent man, and becomes a better citizen from feeling that he has some little stake at least in the preservation of order. I inspected one of the leases. It was carefully preserved in a voluminous covering of brown paper. On reading it, I found no provision for the renewal of the term. I was told that the understanding was that renewals would be given, but it appeared that that was forgotten in drawing up the lease. They hold, therefore, but on three lives. In the case alluded to, the youngest life named did not then exceed nine years. The house may, therefore, be enjoyed for the next 50 years. At the same time it cannot be forgotten that the term might possibly fall in in two or three. In some cases, more than one house has been built on the ground, which of course, makes the rent lighter. By this means, an unproductive waste will eventually be reduced to cultivation, which will be a decided gain to the proprietor. Indeed, from the very first he is a gainer, inasmuch as land which has been hitherto unproductive yields him 5s. 6d. per acre. Close by, a similar course has been pursued to some extent, on a heath belonging to Lord Eldon. Most of those inhabiting the cottages in question are clay-pit workers. But it may be asked why, if such a step is both profitable and humane, it is not more generally followed by other proprietors, and more largely pursued by those just named? The great drawback is that so often already alluded to—the fear of burdening the parish and the estates with rates.

But if cottages are so much in demand, it may be asked why, if the landlords will not build them, others, who are neither labourers nor landlords do not do so? There could not be a more profitable

investment of capital when the rents are regularly paid, and many would so invest if it were in their power to do so. But cottages cannot be built in the air, although their foundations are sometimes laid in water. Those who would willingly invest their money in building them cannot get the land on which to build them. All the land about Wareham is so strictly settled as scarcely to admit of this. If one of the most respectable inhabitants of Wareham wanted to build himself a house, it is questionable if he could get the land. Not that the landlords would in all cases refuse it, but that in many cases they cannot part with it. A rather ludicrous instance of this occurred a short time ago. A firm in Wareham had negotiated with one of the neighbouring proprietors for a lease of a certain piece of land for some works, which were to be carried on upon it; but when the agreement came to be carried out, the proprietor found that he had so strictly tied up the land that he could not give the lease.

This scarcity of cottages is a complicated evil. It sometimes drives families to the workhouse who would not otherwise be there, and at others, serves to keep them perpetually on the parish, after distress has once thrown them upon it. In the Wareham workhouse, for instance, was a woman with her six children, her husband being at the time at work, and in the receipt of wages, but staying with his mother because he could not procure a cottage for himself and family. The woman herself evidently felt her situation very much. She and her whole family would leave the workhouse if a cottage could be procured. Again, take the case of a man whose family is thrown into distress from a temporary suspension of his employment. On applying for relief, he is told by the guardians that they can do nothing for him unless he comes into the house. To this he has many objections, one of which is, that he has his cottage and his furniture—poor and scanty though it be, it is his own; and if he goes into the house his little establishment will be broken up, without the least chance of his recovering it when he comes out again. But the guardians are inflexible, and he must either starve or comply with the requirements of the law. At last he enters the house, and his little establishment is broken up. Some time afterwards he hears of employment and leaves. But his cottage is now occupied by others, or it has in the meantime altogether disappeared. He cannot find another in which to shelter his family, and has to return to the workhouse. He is thus converted into what he never meant to become—a pauper; and being so, he makes up his mind to make the most of his pauperism. The chances are that he never makes another effort to retrieve himself, but remains with his family a permanent charge upon the rates. This is not an imaginary sketch of the pauper's progress, but one drawn to me as true in but too many instances, by one who had been a relieving officer of a district not far from Wareham.

In the town of Wareham itself are some of the worst tenements in this part of Dorset. There was one place, the filthy state of which particularly struck me. It is called Hobb's-lane, and sometimes misnamed New-street. About its lower end there is, on one side of it, a cluster of six or seven

houses, one of which is used as a Ranter meeting-house. In one of these lived a Mrs. Bess with a couple of children, her husband working in the clay-pits. She had two rooms, the lower of which was twelve feet long, seven wide, and about five high. The upper room contained but one bed, which very nearly filled it. For this house she paid 1s. a week. Next door to her lived Mrs. Lockyer, with her husband and seven children. The lower room, in this case, was but eight feet square and five high. The upper room was a little larger, as it extended over the space occupied by the staircase. Here the whole family slept in three beds, which left sufficient vacant room on the floor for a small box, and no more. Sometime ago several of her children had the small-pox in succession. As she and her husband had had it before, they took the diseased child into their own bed, to save the others if possible from infection. When telling me her story, the poor woman was in a stooping posture, although standing in the loftiest part of the room. Her husband was a bargeman, but his wages were most unsteady. They, too, paid 1s. a week as rent. Through the next house the back yard, which was common to all the houses, was drained. In this yard stood the house of Mrs. Lockyer's sister. It was no larger than the other, but she had only one child. About the beginning of the year, the authorities had the yard cleaned up from apprehensions of the cholera. The number of people to whom it was common was twenty-eight. Until that time it had not a single privy. There was a large hole in the centre, into which everything was cast. The overflowings of this hole passed by an open drain through one of the houses into the street. The house was that next Mrs. Lockyer's. The hole is now filled, but the drain is still there, carrying off the filth of the yard. Within the house it is now covered with a board, which is lifted every time that the inmates wish to clean out the drain. The filth which it discharges is carried along the centre of the narrow lane, by the fronts of the other houses. This property belongs to Mr. Calcraft, but it seems that he has no immediate power over it, the houses being in the hands of lessees for lives, who draw the rents.

I was courteously accompanied over the Wareham workhouse by some of the guardians. In one of the sick rooms I found several paralytic patients of all ages. One was in bed, and another who was dressed, was sitting on a bed next him. This latter was a strong, lusty young fellow, who in his countenance bore no signs of disease. The paralysis under which he laboured had, according to his own account been superinduced by his wearing "damp shoes." I ascertained from the younger paralytic that he was from the village of Bere, about seven miles to the north of Wareham. He had come from Bere but a few days ago, and the wages which were being then paid in its neighbourhood did not exceed 7s. a week. Those who were not exactly able-bodied were getting 5s. and 6s. Nor was the house-room or fuel included in this. Whether they received 7s., 6s., or 5s., they paid rent for their houses, and had to buy their fuel, which cost them 3s. a load for cutting, and 9s. for carting. I lost no time in making my way to Bere, to ascer-

tain if things were really as bad as represented. For five miles the road runs through an almost unbroken heath—for the other two, it is flanked by cultivated fields. The village is the property of Mr. Drax, M.P. for Wareham. I found no exaggeration in the statement made to me at the workhouse. The wages had not been misrepresented, nor had the workmen any perquisites or "privileges," as they are more generally called. Their accommodation in the village was of the most wretched description. It is almost impossible to convey an adequate idea of some of the huts in this village. In one, known as the Will House, I found a widow and four children. It was a kind of parish house, and had, as she said, been for a long time a refuge for widows and orphans. The lower room with its clammy clay floor, was not much more than ten feet square. The bedroom above was gained not by a staircase, but by a ladder which let you through a hole in the floor. She paid no rent; but had been told that some repairs were to be effected, when it was expected that she would pay. She had an allowance from the parish. The next house, although not much larger, was more comfortable. It was inhabited by a married couple who had paid no rent, but had themselves kept it in repair; that is to say, they had kept it from tumbling about their ears. The next hut was occupied by an invalid couple and their four children. The eldest child was a girl of eighteen, the next, a boy of fifteen. This house had a brick floor and was kept tolerably clean, although the poor creature who kept it so was in the last stages of consumption. Her increasing debility she attributed to palpitation of the heart. She showed me the bedroom up stairs; the climbing of the ladder by which it was reached so exhausted her that she nearly sunk upon the floor on gaining the top. There were three beds in the room, for seven slept in it, the seventh being an orphan child. "Had the child any claim upon you," I asked, "that you should keep it?" "O no," she said; "but, poor dear little heart, it had no friends, and I didn't like to see it go to the union." So true is it that the poor support the poor. It was all the more remarkable in this case, inasmuch as they themselves were chiefly supported by parish allowance, which amounted to 2s. and four loaves a week. The eldest girl earned something, though a mere pittance, by making buttons, and the boy sometimes made a shilling or two. The woman's husband seemed also in a consumption. He had been "off work" for nearly two years, and his eye was bright and his cheek flushed. He put out his tongue to show me the fever he was in. Its whole surface was white and furred. He lamented that, although there were about 1,500 people in the parish, there was not a single resident gentleman in it "to say a word for the poor."

I next visited a hovel which stood by itself on the opposite side of the road, I could scarcely make out how it stood at all, so broken and dilapidated did it appear on all sides. The floor was of earth, and the ceiling, which was of plaster and reed, was nearly all gone. Half the chimney piece had fallen down. There was scarcely any furniture in the house. Here also the upper room was

gained by a ladder. It contained two beds, the family consisting of six people. The only person in the house at the time was a girl of about 16. I asked her her name, whereupon she told me that her father's name was Purchase and her mother's Stansfield. I afterwards learnt that the father had run away from his wife, and lived with this woman, by whom he had a family of four, of whom this girl was the eldest. The mother and two daughters slept in one bed, and the father and two sons in the other.

These are certainly specimens of some of the worst houses in and about Bere, but there are many others nearly as bad. For some of them a rent as high as £3 5s. is paid by labourers receiving 7s. a week.

Not far from Bere is another small place, called Kingston, the property of Mrs. Mitchell. Many of the houses are of the lowest description, and scarcely any provision has been made for draining.

In another direction is a place called Tingleton. The property on which it stands is in the occupation of Mr. Porcher. Here the condition of the labourer is in striking contrast with his state in the places already alluded to. His cottage is clean and comfortable, and he has, in most cases, about half an acre of ground attached to it, and all at a very moderate rent. The labourers who are badly off in the neighbourhood are constantly contrasting their condition with that of those at Tingleton.

I then proceeded to Winfrith, about twenty miles to the south-west of Wareham. Here the labourers are as badly housed as in Corfe or Bere. The wages in this district have recently been reduced from 8s. to 7s. In some cases, an attempt was made to reduce them to 6s., in the case even of able-bodied men. The reduction created quite an excitement in the district, and the labourers in a body waited upon Mr. Weld, the proprietor, who, however, told them that he could not interfere with the farmers. The consequence was, that, shortly afterwards, the horizon was lighted, in several places, with fires. Three incendiary fires have occurred at Winfrith, another, I believe, at Pimperne, on Lord Portman's property, and still another at a place called Compton, a little further to the north. A reward of £100 has been offered for the apprehension and conviction of the Winfrith incendiaries. Two of the farmers who have suffered are members of a Labourers' Friend Society, which had a meeting at Wareham about three weeks ago, at which prizes were distributed to the labourers. Two of these, viz., coats with brass buttons, have never been called for by those to whom they were awarded. They are still lying unclaimed at the hotel. On asking some labourers why this was so, they said that they were no longer to be gammoned by such professions. Others went so far as to justify the fires, as the only voice in which the labourer could speak with any chance of being heard. The prevalent feeling amongst them was very bad, and many were sorely annoyed that it was not the farmers, but the insurance offices, that suffered by the fires. A suggestive circumstance in connection with these fires is the almost complete silence of the local press respecting them.

On shifting the scene of inquiry to Blandford, I

removed into the heart of a purely agricultural district. Notwithstanding this, I expected to find wages comparatively high in the immediate vicinity of the town—there being causes in operation to keep them up, as I thought, although not the same as those existing at Wareham. Around Blandford is to be found a numerous resident proprietary, the chief of whom are Lords Portman, Portarlington, and Rivers, Sir John Smith, Sir Edward Baker, Mr. Seymer, M.P., Mr. Farquharson, and Mr. Drax. The presence of these gives employment to numbers of the peasantry, and higher wages are paid by some of them than by the farmers. But still the wages of the district are not kept up—7s. a-week being the ordinary rate for day-labourers. Carters and others, in somewhat confidential employments, have 8s. and 9s. Blandford is very much overcrowded, particularly in one or two of its lanes. This is chiefly attributable to the labourers having been driven from the surrounding parishes into the town. They have been driven in from the property of Mr. Farquharson and Lord Portman, but particularly from Milton Abbey, the property of Lord Portarlington. Lord Portman has enabled some of his labourers to emigrate. They can drive no more into Blandford, because every nook and crevice in the town is full. But the steadiness of the pressure is evinced by the fact, that whenever a house or a room becomes vacant, the applicants are generally far more numerous than can be accommodated. This is not only the case in Blandford, but also in most of the surrounding villages.

It is by considering his circumstances in these villages that the condition of the labourer in this district can be best appreciated. In most of them, he is reduced to a point so low, that it is impossible to imagine him going beyond it compatibly with mere animal existence. Between Blandford and Wimborne is the village of Sturminster Marshall, which exhibits the very acme of physical wretchedness, and intellectual and moral privation. Around it the average rate of wages can certainly not exceed 7s. a week. In the opposite direction, and about two or three miles from Blandford, are the two villages of Durweston and Stourpaine—the former the property of Lord Portman, and the latter that of Lord Rivers. Both in appearance and actual comfort there is a striking difference between them. In Durweston the houses are in the main much better than those in the neighbouring village, whilst they are also less crowded with inmates. But there are two reasons for this. The first is, that some of Lord Portman's labourers have emigrated, others have gone to the contiguous parishes, and by both processes the estate has been relieved. The other is, that the village of Durweston is the residence of the celebrated "S. G. O.," who, by his exposures of the condition of the labourer, has made himself so obnoxious to Dorsetshire squires. It is to be regretted that his neighbourhood to Stourpaine—for his residence is scarcely a mile from it—has not had the effect of improving it also. Although the property of Lord Rivers, his lordship has at present little, if any, control over it—most, if not all, of it being leased on lives, and some of it in the hands of those whose only source of income is the rents extorted from the miserable beings who inhabit it.

The first house which I visited here was a low wretched tenement, built of bricks, which were fast crumbling to decay. It was inhabited by a family of eight, bearing the name of Haywood. Some time ago they mustered twelve, and only two months since ten. Death had, about the latter period, taken two from their number. They had 2 rooms, the lower one being about 12 feet square, with scarcely any furniture, and a cold, damp, and broken earthen floor. The upper room, which was in the roof, was in a state of almost perfect dilapidation. It contained three beds, once occupied by twelve people, but now left to the eight who remain. When it rains, the beds have to be removed from place to place to avoid the water, which comes dripping through the roof. When the two died they had fever in the house. Several of the children were ill, but it proved fatal only to these; six of them were at one time crammed into one bed, to avoid infection. Of the two who died, one was a young man, the other a child. "The burials were five days apart." In each case the body lay in the sleeping room of the family until it was removed. The rent paid for this hovel is 1s. a week to one of Lord Rivers's lessees. There is no garden attached to it, and the same may be said of most of the houses near it. There is but one privy, and that is common to a whole cluster of houses. The eldest of the Haywood family now at home is a girl of twenty-one. The father is a labourer in the receipt of 7s. a week. Their diet is bread and potatoes. They scarcely taste meat once a month, and then they will have but about half a pound amongst them. They have an allotment ground of 40 lugs, on which they raise their potatoes, and for which they pay 8s. 4d. a year. But for this, they say, they would be starving.

The next house also contained a family of eight. Their name was Allan. They had but two small rooms—the bed-room being off the common room. It contained but two beds. The father, mother, and three children slept in one bed—the children being put at the foot; the other three, all girls, occupied the other bed. The eldest girl was sixteen, the eldest boy at home eight. The family had occupied the house for sixteen years. The mother had never been well since she entered it. No wonder, for the house was cold to a degree. There was a kind of cellar below, which had formerly been occupied, but which was now nailed up. There was no ceiling below, and the wind came up through the floor. The window was almost half gone. It had originally consisted of twenty-four small panes, ten of which were broken—both glass and casement. It had been in that condition for more than five years, and was covered with brown paper or stuffed with rags. In the bed-room there was no casement at all. The hole which served as a window was nightly covered by a piece of bagging "to keep out the wet and cold." The rent charged is £3 per annum. For the last year they have only paid 6s. They could not pay more, and did not like to say anything about repairs, as they were in arrear. But it was quite as bad as now, when the rent was regularly paid. Allan himself was a labourer at 7s. a week. There was a talk of lowering the wages to 6s. They were allowed no fuel, and

had no "privileges." The parents got but little help from the family. "Mine do run upon daughters," said the woman, "and they get us little or nothing." In addition to this, her husband's work was not steady. It would be difficult enough, she said, to get on, even if it were so, but with "broken work" they would starve, but for an allowance of bread which she had from the parish.

The next house which I inspected was occupied by a family of the name of Read, consisting of husband and wife and two children. The rent charged was £3 10s. They had paid £1 15s. a few months ago. The man's earnings were only 6s. a-week. He was not quite able-bodied. When I entered he was at dinner, seated in a dark corner, over a meal of potatoes and cabbage. The floor was of brick, and was kept clean. Above were two very small bedrooms, cleaner than most chambers of the kind that I had seen. There were great fissures in the wall, however, through which the wind could freely enter, but that it was prevented from so doing by broad patches of London newspapers pasted against the plaster, and thus put to a purpose similar to that assigned to Imperial Cæsar. The woman busied herself in making buttons. She has got as low as 3d. a gross for them. Working busily, she could make a gross in a week. The house was held of "Farmer Cole," one of Lord Rivers's lessees.

The next house, which was of about the same dimensions, was occupied by two old women who were supported by the parish. There were three children living with them, one of whom was deaf and dumb. Their allowance was 2s. a-week and two loaves each. Out of this they had to pay 9d. a-week for their barn to Farmer Cole, and had also to find their own fuel. Their diet was bread, with occasionally a little butter. They never tasted meat.

I visited several other houses, but they were all of the same class, and all equally bad. One occupied by a family of the name of Upwood was particularly so. Its clay floor was full of holes, which formed receptacles for moisture during wet weather. The family numbered seven, and they all slept in the roof. Two of them slept in a bed which rested on a kind of elevated stage, near the angle of the roof, which was gained by a ladder. The eldest daughter, a tidy and interesting-looking girl, was seated at the window making buttons. These buttons are made with cotton thread sewn upon a small steel ring. She was getting 10d. a gross, but it would take her a week to earn it. She had to find the cotton too out of the 10d., which would reduce her earnings to 8½d. a-week. She had been at work all that day since nine o'clock, from which hour till four o'clock, when she gave up work because it got dark, she had earned about a penny! No wonder that she was anxious to go out to service.

Adjoining this was Emily Bull's house, whose husband was a farm labourer at 7s. a-week, without fuel. They had seven children, and the nine slept in three beds in one room.

I could multiply such instances, if necessary, but it is not so. Enough has already been said to convey some idea of the physical condition of the labourer in the district around Blandford. There are some of them tolerably housed, but seven-

eighths of them are most deplorably accommodated. The illustrations already given, too, may serve as a type of the state of things in the vicinity of Shaftesbury. Drawing a circle around that place, with a radius of about five miles, the state of the labourer in the portion of it falling within the county of Dorset is so bad that it could scarcely be conceived worse. It is common to find eight occupying not only the same house, but the same bed-room. In one instance in which I found this the case, Samuel, the eldest of the family, was 22, Elizabeth, the next, was 20, and George, the next, was 18. The two lads were rather equivocal characters, which only made the arrangement all the more objectionable. Perhaps the spot in which the labourer is worst off in this neighbourhood is the village of Stour Provost, about four miles from Shaftesbury, and the property of King's College, Cambridge. In the immediate neighbourhood of Lord Westminster's residence wages may be a little higher, but their average around Shaftesbury is 7s. a-week. Everywhere the labourer dreads a still further reduction to 6s. Thus the wretchedness of his actual circumstances is enhanced by his having still more gloomy prospects to contemplate.

Generally speaking the Dorsetshire labourer experiences but little competition from migrating Irish labour. There are sufficient hands in the county to perform even the extra work of harvest time, without importing labour for the purpose. Now it may be taken as an axiom, that where this is the case there are more hands than are required during at least three-fourths of the year. This is the case with Dorset, and goes far to account for the low state of the labourer within it. In Lincolnshire and in other parts of England, and in the Lowlands of Scotland, it is otherwise. There the number of hands suffices for the greater part of the year, but not for the harvest, when labour has to be imported. This will, to some extent, account for the superior condition of the labourer in these parts.

There has been considerable emigration from Dorsetshire, chiefly promoted by the larger proprietors. Multitudes more would go, were they not deterred from leaving the country by their profound ignorance of everything connected with the places whither they would be sent.

From what has preceded, it will have been seen that the staple dietary of the Dorsetshire labourer is made up of potatoes, bread, cabbage, and turnips, and that even of them he and his family have not always a sufficiency. I shall have occasion again to refer more particularly to the dietary of different union workhouses in different parts of the counties which I have visited; but, in contrast to the diet of the independent labourer in Dorset, permit me here to present you with the present dietary of the Blandford Union:—

"BLANDFORD UNION DIETARY FOR ABLE-BODIED PERSONS ABOVE NINE YEARS OF AGE.—NOV. 22, 1849.

	Break-fast.		Dinner.						Supper.	
	Bread.	Gruel.	Suet Pudding.	Bread.	Cheese.	Cooked Meat.	Vegetables.	Beef Soup.	Bread.	Cheese.
	oz	pints	oz	oz	oz.	oz	oz	pints	oz	oz.
Sunday										
Men.....	6	1½	16	..	..	..	..	..	6	1½
Women	5	1½	14	..	..	..	..	..	5	1½
Monday										
Men.....	6	1½	..	7	1½	..	..	..	6	1½
Women	5	1½	..	6	1½	..	..	..	5	1½
Tuesday										
Men.....	6	1½	..	..	..	5	16	..	6	1½
Women	5	1½	..	..	..	4	16	..	5	1½
Wednesday										
Men.....	6	1½	..	7	1½	..	..	..	6	1½
Women	5	1½	..	6	1½	..	..	..	5	1½
Thursday										
Men.....	6	1½	..	..	..	5	16	..	6	1½
Women	5	1½	..	..	..	4	16	..	5	1½
Friday										
Men.....	6	1½	..	7	1½	..	..	..	6	1½
Women	5	1½	..	6	1½	..	..	..	5	1½
Saturday										
Men.....	6	1½	..	4	..	..	..	1½	6	1½
Women	5	1½	..	3	..	..	..	1½	5	1½

"Old people of sixty years of age and upwards may be allowed 1 oz. of tea, 7 oz. of butter, and 8 oz. of sugar per week, in lieu of gruel for breakfast, if deemed expedient to make this change.

"Children under nine years of age to be dieted at discretion.

"Above nine years of age to be allowed the same quantities as women.

"Sick to be dieted as directed by the medical officer.

"Approved of by the Poor-law Commissioners, February 9, 1837."

One hears a good deal in Dorset of the "privileges" of the labourer. These are generally extended only to the regularly employed labourers on the farms. The great bulk of the ordinary day labourers have them not. And, after all, even to those who have them they are worth but little. When a labourer gets a free house, he is compelled to put up with any hole that is offered him. When he gets his wheat at a shilling less than the market price, in nine cases out of ten he only gets "tail-ing," at their real market value. Sometimes he has his fuel, at others not; and his perquisites for his pig, if he has one, are meagre in the extreme. On the whole, he would be a gainer if all his privileges were compounded for 1s. a-week.

Such is the condition in which I found the labourer in Dorset, viewing it, as I did, from three different centres of observation, illustrative of his condition throughout the county. If, as regards the condition of the labourer, Dorset does not merit the unenviable pre-eminence assigned to it by some, it must, at least, share that pre-eminence with Devon, Somerset, and Wilts.

(To be continued.)

ON LAYING DOWN LAND TO PERMANENT GRASS.

There are few practical subjects in farming less completely understood than the laying down of land to permanent grass. The two old-fashioned modes adopted were these: After a field had run its course of cropping, it was after, or during a corn crop, sown with seeds selected from the hay-loft of the same farmer, or of some neighbouring hostelry, the sweepings, so to speak, of the hay-chamber; and a complete hap-hazard medley of seeds was collected together, varying in character according to the kind of land from which the hay happened to be grown; but this circumstance formed no element in the deciding of the points, and either the seeds were those of such grasses as happened to ripen first on the soil—on poor soils the worst—or they were the products of some rich alluvial meadow, and consequently grasses of the richest and most delicate description; and this sad misapplication either produced the growth of weeds, as the seeds which were sown in the first instance warranted, or little or none of the same grasses were matured; and hence the natural grasses or the seeds of weeds predominated, and claimed the possession of the soil.

Nay, some went further. They absolutely sowed merely clover and rye-grass, trusting to the natural grasses eating out these from the soil in a course of years, and so asserting their dominion.

But too often corn, corn, corn, is the bane of grass-seed sowing. We mean not that a crop of corn sown with grass-seeds always does harm; but the land is usually so exhausted, and rendered so foul with corn-growing previously, that no good crops can reasonably be expected. We often hear of instances of mismanagement like the one described by a correspondent, who finds his land in this dilemma.

"SIR,—Will you be kind enough to give me your opinion, through the *Farmers' Journal*, on the following case? I have the management of a field intended to be laid down as permanent pasture, and it has been managed in the following manner:—In 1848 it was ploughed up; in the spring of 1849 sown with oats; in the autumn of the same year drained, and fallowed since. I should mention that the same field was broken up some years ago, and cultivated a few years, and drained at that time, and sown down, but so full of root weeds, that they eventually almost gained complete possession of the surface; hence the necessity of the present operations. I have now got it completely cleared of weeds; given it a good liming—ten tons an acre. I am now giving it a good dressing of manure. Now, what I wish to know is how and when I am to sow it, and where and what sorts of seeds I am to procure. The soil is naturally stiff, with a very strong clay subsoil; the surface soil is, however, much lightened by the addition of ashes mixed with

night-soil and burnt clay, collected from drains and the surface of the field.

"You will much oblige by your opinion in next Saturday's paper. "J. W.

"Leeds, July 23, 1850."

Although we have scarcely sufficient data to decide upon the case in point—such as the depth and efficiency of the drains, the strata on which it rests, and the crops to which it was previously most favourable—still treating it as strong soil, thoroughly drained, fallowed, limed, and manured, and hence in a very favourable state for the seeds, and inasmuch as *time* would be lost by any other process, we would *sow it at once*; of course, without any other crops than the grass-seeds.

The selection is clearly a matter partly of taste and partly of judgment, and, we must also in fairness assert, partly of chance, as to its being correct. We would advise the following mixture, if, as we suppose by the management adopted is the case, a good pasture is wanted:—

	lbs.
Meadow foxtail	6½
Timothy grass	3
Meadow fescue	4
Cock's-foot	3
Rough-stalked poa	6½
White clover	8
Cow-grass	6
Italian rye-grass	8

But it may not inappropriately be asked why should it be a matter of uncertainty—of doubt—of chance—whether you get a good or a bad selection of grasses? The answer is the plainest possible. *Nature is not studied.* We remember a case of a highly intelligent land-agent, who was instructed by a nobleman to lay down a piece of land for an extension of the park; cost or labour was nothing, but the grass must be speedy and good, and must as early as possible assume the "old grass land coat." He selected the best grass field on that kind of land the estate produced; carefully and botanically examined the grasses growing upon it; ascertained the species which were the most flourishing; made a selection from these, and was soon rewarded by a vigorous growth of luxuriant and healthy grasses, which so pre-occupied the soil, that there was no space whatever left for the weeds; and hence in a few years it became "old going" sward. Had he happened to sow species ungenial to soil, climate, situation, geological formation, or any of the elements of proper and judicious selection, the whole might have been a failure!

The fact is, all soils are calculated for a certain

range of plants. The one which grows weeds of a certain character would grow also the same class or range of grasses. Now, if a description of unsuited grasses—non-indigenous, we would say—are unhappily selected, the indigenous weeds being strong and vigorous, will soon over-top and eat-out the finer grasses; whereas if the contrary is the fact, the grasses after a fallow, especially in good heart, when the root weeds are killed, and the seeds oxygenated and germinated, it is not improper to expect that the sown seeds will so assert their dominion as to prevent the growth of the weeds altogether, or at least nearly so.

We cannot close this article without alluding to the transposition of grass land. An interesting case happened within our own observation. A field, which had been a corn crop, and the stubble cleaned, was selected. A grass field was pared, and the whole of the sods removed, and conveyed to the prepared field in the month of February. Giving in horse labour—the work being neither hard nor the horses much occupied—the whole was effected for two pounds-ten per acre, and we defy the most practised eye to detect the transposition—nor, indeed, the difference between this and the adjoining part of the field, which has been a feeding pasture from time immemorial. Nor was any time lost; the whole was growing its regular crop year after year, and that which was a corn crop in 1847, was a good pasture, feeding cattle, in 1848.—Gardeners' and Farmers' Journal of August 3.

Our remarks recently made on the laying down of grass land has called the attention of several of our correspondents to the subject of grass land generally, and to its improvement particularly. We are quite of opinion that the renovation of many grass lands is a process, though much neglected, quite within the reach of the cultivator; and in many cases we shall find that it is a more facile process to renovate an old-going, hide-bound, and unproductive grass field, than to take it out of grass and relay it, however advantageously the latter process may be accomplished. In cold clays, for instance, it is a destruction so complete to think of taking out of grass, and it will be so many years before it can be again got into a moderate swarth, that it manifests a want judgment which any conceivable circumstances can scarcely palliate to attempt it. We are aware that very light land may often be taken out of grass and relaid to great advantage; and so may bog earth, when consolidation and alteration of texture are desirable to a very great extent: and such land may be laid down again to grass, with a prospect of a far readier return for the pains and cost of cultivation. But to think of taking out loams, or soils of a medium description, simply

because bad grass happens to have possession, is a species of patching up a miserable policy, both unnecessary in itself and unworthy the skill of a man of practical experience. A correspondent thus writes us on grass land:—

As the low price of grain will probably cause much land to be laid down to permanent grass, some addition to your very judicious remarks on the subject, in answer to J. W., may be of more general utility. I beg, therefore, to say that the purpose for which the grass ley is designed should be considered, as well as the nature of the soil and subsoil and its elevation. To ensure success all land must be thoroughly cleaned, and, where wet, it should be underdrained; and in most cases it would be benefited by subsoiling, but not by deep ploughing. If designed for water-meadow, unless naturally *dry and porous*, it must be made so by deep underdrains and subsoiling. Wherever irrigation can be practised at any reasonable, though it may be considerable cost, its beneficial influence should on no account be overlooked; and the land should be suitably laid down, both with respect to seeds and surface, whether it be for a meadow or for pasture. Many of the old meadows and pastures have been "let-lay," after exhaustion by bad tillage; and such of them as are bad pastures or meadows might, in these difficult times, be permitted to be dug or ploughed out, drained, and cultivated as soon as the tenant shall have satisfactorily laid down an equal quantity of "old-going" tillage-land for permanent grass. Meadow and pasture, high land and low land, should be sown with different selections of grasses; as many that are very suitable for high sheep pastures are extremely unsuitable for meadows. We see many fields mown for hay where the crop is miserably poor and backward, because the grasses are of a dwarf kind instead of early meadow grasses of a grassy nature, such as rough cocks-foot, meadow fox-tail, Timothy grass, Italian rye-grass, cow grass, and burnet, which are forward and productive meadow-grasses, and valuable as pasture-grasses also, on almost any kind of land. Many meadows and pastures are also poor and backward, which might at a very moderate expense be made forward and productive by irrigation, but where no such attempt has ever been made. When pasture only is required, without ever mowing it, white clover should be a principal grass; but, though it is a most valuable pasture-grass, it is extremely improper for mowing. A little carraway seed, parsley, and narrow-leaved plantain are also desirable for sheep pastures.

There is much weight in your remark, that want of success often arises from the fact that "Nature is not studied;" but still there are plants which prosper in soils, situations, and climates widely different from those in which they are indigenous—as the potato, and several other now-commonly cultivated vegetables, which are only found in their natural state in climates, soils, and situations very different from those they are now seen prospering in. I have found Timothy grass very valuable on extremely high, dry, limestone land. In another case, having a small tillage-field adjoining the farm-yard, in a low situation, it was sown with tares and red clover, and other seeds for soiling; and as it was wanted for a "calf-garth," it was inoculated with old sward, without ploughing, in a wet season in the autumn of the second year, after the clover had been mown two or three times over for green fodder. A few loads of thinly-pared sods were carried on to the ground, chopped into pieces of about three inches square, and, with a fork, laid about six inches apart, with the grass side upwards. A sprinkling of cocks-foot, Timothy, and other suitable grasses were then sown, and the field was rolled after a light

covering of compost had also been thrown over it. In the following spring it was again rolled, mown for green food, and dressed with another light dressing of compost, and it then almost immediately assumed the appearance of a good old pasture, only that some of the clover and other sown grasses grew among the natural grass; but the latter soon supplanted the former. The pasture was also in some degree benefited by a slight, partial irrigation, in a wet time, with the overflowing of a liquid-manure tank in the farm-yard. I have found much benefit arise from a mere sprinkling of long strawy manure or ashes, either dry or moistened with liquid manure, and spread in the autumn on new leys or on winter tares; and plenty of ashes for repeated dressings may be very advantageously made by digging up and burning ditch or roadside banks with thorns, roots, or branches. These, with soil, salt, farm and liquid manure, or with lime (in lieu of the manure), make an excellent compost, with which the new leys should be very lightly dressed every year. Let the landlord give judiciously selected seeds; and thus, by ploughing or (what is far preferable) digging out bad sward, and sowing down old tillage-land with proper seeds, the landlord and tenant may so work together for their mutual interest, as greatly to promote their own individual good and the benefit of the labourer and the public at large.

Land may be properly laid down in the autumn; but it is generally more profitable to sow it with corn and seeds in the spring. Even in the autumn it is better to sow a mere sprinkling of oats or wheat with the grass seeds. Rape or tares are sometimes sown; but they are too smothering. Calves or other light cattle are the most suitable stock for young grasses. Sheep are excellent managers of pasture land, after the first year; but their close cropping and treading injures the young herbage, from off which all stock should be kept in a

wet time. Strong soils become more kindly and lighter by being laid down to grass for a few years.

A. R. F.

We would venture to affirm that the most stubborn grass land might be brought round by a process something like this:—If necessary let it be first thoroughly underdrained, whatever be its kind or texture; then attend to the following directions. If light, let it be eaten by fat sheep early in the spring, to which an allowance of oilcake (1lb. per day each at least) is given; this will induce them to eat up the worst grasses, and supply food for a better kind. Let it then be composted with clay and dissolved bones, in the proportion of 50 to 100 loads per acre of clay and 5 bushels of dissolved bones. The white clover will be found to grow most luxuriantly after this treatment. Strong clay requires a different treatment. Let it be, in the month of February, covered with four to six tons of the mountain lime per acre; then let a compost of fresh soil and grass seeds be scarified in, in the month of March or April, and the whole well rolled repeatedly; and a great increase in the productiveness and value of the field will follow. We shall resume the subject shortly, as it appears so much to interest our readers.—Gardeners' and Farmers' Journal of August 17.

GLEANINGS IN AGRICULTURE.

(Continued.)

60. *Arundo arenaria* (Sea-reed or Mat-grass).—This is strictly a maritime plant, only to be found on the loose driving sands of the sea shore. Vegetating in this peculiar situation, it stems the torrent of an inundation of drifting sand, little less destructive than the fury of the sea; and by its matted roots "the proud waves are stayed." Its roots being somewhat of a woody nature, have been by many indigent dwellers on the bleak shores collected for fuel, and the consequences have been ruinous: the wind catches the sand, and finding no impediment, pours in one continued stream over the surrounding country. Laws so early as in the reign of Elizabeth were in force, to prevent the pulling up of this plant, and to encourage its growth. So severe was the law, that it was considered penal, not only for any individual (without even excepting the lord of the manor) to cut this bent, but for any person to be in possession of any within eight miles of the coast. That this plant was designed by Nature, the immediate use of which we are permitted to know, and whose virtues are within the level of our comprehension, few can deny; and whoever has watched the various changes that take place upon the coasts of the ocean must be sensible

how much has been saved from removal by the agency of this plant alone. Its cultivation as an agricultural grass is not attended with any happy results out of the influence of the salt spray. The nutritive matter of this grass affords a large portion of saccharine matter. Sinclair says—"The quantity of nutritive matter afforded by *Elymus arenarius*, No. 33, is superior to that afforded by our present subject in the proportion of 4 to 5." His experiments—"At the time of flowering, the produce from a siliceous sandy soil was 10,890 lbs. per acre." This grass should be extensively cultivated in sandy exposed places along the sea coast, particularly in the low-lying counties. The seed is rarely, if ever, driven by winds beyond its chosen sandy station, but drops off and vegetates in its selected bed. When cut and mixed with other food, it is readily eaten by cattle. This grass is also known under the name of *Pasmina arenaria* (Beauv.).

61. *Triticum junceum* Nou., *Agropyrum junceum* of Beauv. (Sea wheat grass).—This is also one of those plants which is designed by nature as a fetter to the driving sands. Although not so efficacious, it is no very despicable auxiliary to No. 60 in this important office; it vegetates freely above high water mark, amidst the

dry sands upon most of our sea shores, when it is frequently buried in the drifts; the straw is firm and almost woody, and the foliage partakes of this hardness; the roots are strong, creeping and penetrating deeply amongst the sand. Cattle do not relish it. A perennial, and flowers in June or July.

62. *Hordeum murinum*, Lin.—Wayside barley, wall barley, mouse barley, way bennet.—Such are the names by which this very common and one of the most inferior grasses, with respect to nutritive powers, is known. It is invariably to be found near cottages, about paths in villages, under walls, and in churchyards, and when once established keeps possession of its station for a long term of years; it not often intrudes itself into the upland pasture fields, but when there found it is invariably rejected by cattle; the sharp spines constituting the head cause irritation in the mouth, and teaze instead of nourish; yet it is readily eaten by cattle in a young state. It loves the neighbourhood and association of man, yet of its virtues we remain in ignorance. According to Sinclair's experiment, at the time of flowering the produce from a clayey loam was 12,251 lbs. per acre. "The produce of this annual, at the time the seed is ripe, contains more nutritive matter than at the time of flowering; this is a contrary result to all others of the annual grasses, but it is, I believe, chiefly owing to part of the seed having been left on the spikes, while in all other instances it was separated from the grass previous to its being submitted to experiment." It flowers in July, and the seed is ripe in about four weeks.

63. *Hordeum pratense*, Weed. (Meadow barley).—Our present subject is readily distinguished from the preceding, No. 62, by its taller and more slender habit and more plentiful herbage. It is found in low and damp meadows as well as dry uplands, being the only one of the genus which vegetate amidst pasture grasses. There is a diversity of opinion with respect to this grass. It is an excellent grass for sheep pasture. In Norfolk, according to Sinclair, this grass forms the principle herbage, and the proprietors of the lands in question are famed for their superior herds of sheep. When made into hay it is not relished by cattle, owing to the long sharp awns with which the spikelets are armed. It is an early grass, producing a considerable amount of herbage in the moist situation in which it delights. It is, however, a grass not to be recommended to the farmer for a hay crop, but as a pasture grass. It is a perennial, and, according to the experiments of Sinclair, at the time of flowering the produce from a sandy loam with manure was 8,167 lbs. per acre. The grass at the time of flowering contains more nutritive matter than at the time the seed is ripe, in the proportion of 15 to 12. It flowers in July.

64. *Bromus erectus* (upright Perennial Bromegrass).—This is far from being a general plant: many counties do not possess it at all. It is found rather plentifully on the dry stony hills of Wilts, Somerset, Oxfordshire, Cambridgeshire, Kent, and Norfolk. The harshness of this grass makes it to be always rejected

by cattle, which consume the herbage in the neighbourhood. In places where it abounds it often gives to the fields a very delusive appearance of producing a good crop, which examination detects to be only a worthless herbage. It, however, like many other plants, seems to acquire a harshness and roughness accordant with the situation. It cannot be recommended either as a pasture or hay-grass. It flowers rather early, but the foliage is comparatively late in growth. Sinclair says that pheasants are fond of the seeds, frequently picking off the spikelets before the seed is perfected, which are produced but in small quantities; and according to Sinclair's experiments, at the time of flowering the produce from a rich sandy soil was 12,931 lbs. per acre.

65. *Phleum asperum* (Rough Cat's-tail grass).—This is rather a rare grass, found in dry open fields in Bedfordshire and Gloucestershire. In rich garden-ground this grass attains a high degree of luxuriance; being well adapted as a hay and pasture-grass, cattle are particularly fond of it. The greatest drawback to its more general cultivation is its rarity, and producing seeds but sparingly. We, however, recommend it to the consideration of the agriculturist. It is a native, an annual, and flowers in July.

66. *Phleum Bochneri* (Purple-stalked Cat's-tail Grass).—The spring produce of this beautiful grass, in an agricultural point, is but small. The root-leaves are remarkably short, and the culms are numerous and smooth. Those who have only seen this as a nursling in the garden, would scarcely recognize it in its natural state. It is a native and a perennial, flowering in July. According to the experiments of Sinclair, at the time of flowering the produce from a siliceous sandy soil was 6,806 lbs. per acre.

67. *Panicum verticillatum* (Whorled Panick-grass).—Of all the genera of our British grasses, *Panicum* is the most rare, being chiefly found in cultivated fields. Our present subject, we are satisfied in our own mind, is well suited as an agricultural plant, both for hay and pasture. It delights in a rich, moist soil, and cattle are particularly fond of it. The valves of the corolla—ten of them—invest this seed in the genus *Panicum*, and formed of a substance much more strong and durable than that of any other of our grasses, and when dry are almost like bone, being a peculiar provision for securing the seed from the depredation of insects, and from the injuries of the transition of seasons, as the seed remains in the soil for at least eight or nine months previous to germination. Notwithstanding, however, this ordination of securing the continuation of the race of *Panicum*, we find them rarely; and even in stations known to have produced them half a century past, they appeared to have scarcely wandered from the small circumference they were originally observed in. It is found somewhat plentifully on the banks of the Thames, between Putney and London, in several places. An annual, in flower in July and August.

Milton Abbey.

J. M'INTOSH.

(To be continued.)

THE LIVE AND DEAD MEAT MARKETS OF THE METROPOLIS.

Some time since we directed the attention of graziers and feeders of stock to the serious loss to which they are subjected from the want of necessary accommodation in the live and dead meat markets of the metropolis, amounting in the aggregate to not less than £200,000 per annum. The government stands pledged to remedy this evil in the next session of parliament, and for a season it must still be endured; nevertheless it behoves the stock-feeders, the manufacturers of meat for the great metropolitan market, to take care that in obtaining relief from one source of undoubted loss they are not inadvertently, and through the theoretical notions of the parties practically engaged in making the arrangements for the change, exposed to suffer from another. One of the most serious sources of loss in Smithfield market arises from the suffering of the animals through want of space, which causes such rapid deterioration that, when a bullock or sheep has once been submitted to the ordeal, a prudent salesman will recommend a sale at a sacrifice rather than keep it over to the next market-day; whenever, therefore, the numbers posted on the morning of the market-day indicate a large supply, the butchers, knowing the consequences, hold back, and a corresponding effect is produced on prices. If the extra seven hundred or a thousand bullocks, and the surplus six or seven thousand sheep, as the case may be, had been delivered at the market, and so treated when in it as not to have undergone more fatigue and suffering than in an ordinary fair or market, they might be returned to the lairs, and appear on the next market-day as fresh as ever; the supplies on the several market days would be equalized, and the loss resulting from a compulsory sale in an overstocked market avoided.

In removing the metropolitan live cattle market to a site where sufficient space can be obtained, the feeders of stock should take care—which they can do by communicating with their representatives—that the site be not so far removed from the metropolis as to be inconvenient to the metropolitan butchers as a body. Such a course would have the effect of encouraging the system of killing in the country, and sending the carcasses to London—a course by no means advantageous to the feeders of stock. At certain seasons this trade may be advantageously carried on; but it must be borne in mind that meat so sent is exposed to the effects of the weather, and must be sold at whatever it will fetch. The live animal, if properly treated and

taken care of, may be kept over for another market: the dead carcass cannot. The official announcement of the first minister of the crown, that a Bill for the removal of Smithfield Market will be brought forward in the next session of Parliament, renders it highly desirable that the feeders of stock for the supply of Smithfield Market should inter-communicate with each other, and take means of placing their views and opinions before those members of the House of Commons who represent them. This is not a question of Liberalism or Conservatism, of Protection or Free-trade; but merely whether the manufacturer of one of the most important articles of food for the metropolitan public shall have provided for him a mart wherein his goods can be commodiously and fairly exposed for sale, and where, if needful, he himself or his agent may see that they are honestly sold; and if not required on one market day, he may be able to remove them in good condition and undamaged, to appear at the next. That such is not the case now none will deny, save those who are profiting by one of the grossest systems of monopoly and charlatanism that ever disgraced the worst specimen of bygone corporate or trades jobbing. As, however, was well observed by the *Times* a short time since, “Smithfield Market cannot be permitted to exist even twelvemonths longer;” and we have no doubt that the remark will turn out literally true. Nevertheless there is one branch of this monopolizing system which, causing as it does much injury, may be remedied even during the existence of the present bad system, provided the parties sending cattle to the London market give directions to the proper effect. These remarks apply particularly to cattle sent from a great distance, as, for instance, from Scotland. And here we may remark that we are much surprised that our Scottish brethren, so proverbially distinguished for their acuteness, should not have long since discovered the great abuses and consequent loss occasioned by the Smithfield system, and especially the treatment which the cattle receive on their arrival in London by the railways and steamboats after a fatiguing journey. Those coming by the boats are usually landed at Blackwall; many of them are driven to lairs at Kennington, a distance of six miles over the stones, and through the most crowded thoroughfares of London. From thence they have four miles to travel again over the stones to Smithfield Market. It is no uncommon practice to send the turned out or

unsold cattle to lairs or resting places belonging to particular parties, some of them twelve, fourteen, and even sixteen miles from town, thus unnecessarily driving the animals these long distances after having undergone the fatigue and suffering of standing in the market, to the manifest injury of the cattle and loss of the owner. The object is obvious—the lairage is to be secured for the advantage of some interested party. That such a course is unnecessary is apparent from the fact that the Islington Cattle Market having most extensive covered lairs, with every convenience and accommodation, is within two miles of Blackwall, and a still less distance from Smithfield; the road excellent, no travelling over the stones, and no turnpike tolls. The same remarks apply to the foreign cattle landed at Blackwall. There is a superintendent, and a requisite number of men always in attendance at the Islington Market lairs. Cattle may be consigned to the lairs direct; and if notice be given to the superintendent by post, proper persons are sent to the railways to receive the animals, bring them to the lairs, see them taken proper care of, and safely handed over to the sales-

man for whom they are intended. The orders of the owner are in every respect implicitly obeyed, the lairs being devoted to the general accommodation, and no interference exercised with the salesman's business, except in compliance with the directions of the owner. We would recommend persons sending stock to the London market, who feel for the fatigue and suffering their animals undergo by the present system, and who consequently feel for their own pockets, to consign their cattle to the Islington Market lairs direct, announcing by letter that they had done so, stating the conveyance by which they would arrive; also to advise their salesman where they were sent, and the period when in due course the cattle were, and that they would be delivered over to him by the lair keeper, with instructions that if they were not sold they should be returned to the same lairs. If fat animals lose weight, and consequently money, by being driven long distances, and undergoing fatigue, there can be no question that the advice we are now giving is *sound*, however unpalatable it may be to those who profit by the present system.—Mark Lane Express.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

SALISBURY, FEB., 1850.

South Wiltshire includes the extensive district stretching from Salisbury to within a few miles of Devizes, called Salisbury Plain. This is a somewhat elevated expanse of chalk downs of an undulating character. When seen from a distance it appears a vast uninhabited tract, with slightly swelling slopes; but as the traveller passes through it, he discovers that it breaks down into numerous valleys, nestling amongst the green meadows of which are the farm houses and labourers' cottages, the parish church, and sometimes the well-wooded park and mansion of the lord of the neighbouring manor. These are the sheltered spots of the district, for along the open downs the cutting blasts of winter meet nothing to intercept their severity. Here and there on the horizon a strip or clump of fir-trees may be seen; but the face of the country is bare and unsheltered, with no fence dividing field from field, and no prominent land-mark to guide the traveller, who must trust to the finger-posts of the different roads which intersect the country. The soil is of various character, all on a chalk substratum. On the hills it is mixed with flints; the sides of the hills are a chalky loam, the flatter parts a flinty loam, and the bottom of the valleys which drain the district consists of the *debris* of the adjoining downs. It is a thin, dry soil, well adapted for the system of folding sheep, and

hitherto kept in cultivation by a diligent prosecution of that system. The greater proportion of this extensive tract has been brought into cultivation since the passing of the act for the commutation of tithes. The fertility of most of it is artificial, the result of capital and labour skilfully applied; and, as the country is not fenced, requires no draining, and the sheepfolding involves no expenditure in buildings, it appears that the increased produce derived from the land is almost wholly the result of the tenant's exertions. The commutation of tithes was, therefore, a great boon to the landlords, as their tenants then became desirous to plough up the down lands, and obtained permission to do so on condition that they should pay an increased rent. In this way down lands, not worth more in their natural state than 3s. 6d. or 5s. an acre, were at once raised to 15s. or more, and that without any outlay on the part of the landlord. The land was held in very large farms by men of capital, whose chief dependence was on their sheep stock, and who, occupying wide tracts as sheep walks, became gradually very extensive tillage farmers, willing to pay an increased rent for the right of converting down to arable, so long as they were encouraged to do so by a high price of corn. This change of system involved a great increased outlay of capital, for it is obvious that a man with sufficient means to stock and carry on a sheep walk of 2,000 acres

would find that very inadequate for an arable farm of the same extent. It is to be feared that many were tempted by prices to embark a large amount of borrowed capital, in the full expectation that these prices would be permanent; and the pressure upon such farmers at present is very severe, as the landlord has abated only 10 per cent. of his greatly increased rent, and the lender of money is very possibly pressing the borrower, in the fear that his capital as well as the tenants' may soon be absorbed. The size of arable farms on Salisbury Plain varies from 800 up to 5,000 acres, a cultivated field being often two or three miles distant from the homestead. A portion of this on most farms is unbroken down, which, till now, was undergoing an annual diminution. The extent of the operations here may be indicated by the fact that one farmer has as much as 800 acres in wheat annually; and 400 or 500 acres of corn, and 200 or 300 acres of turnips on one farm are nothing uncommon. The returns are calculated on the gross, little items which engage the anxious attention of the small farmer being here thrown overboard altogether. The farmers, in fact, who generally hold on lease, are a superior class of men, renting the sporting of the manor as well as the land, and in many cases occupying the manor house, and exercising that position which, from the non-residence of the owner, devolves upon them.

The sheep-fold and artificial manures are looked upon as the mainstay of the Wiltshire down farmer. The system of husbandry pursued is precisely similar to that already described by us as practised in Dorsetshire. To repeat it in detail, therefore, would needlessly occupy valuable space. When the downs are first broken up, the land is invariably pared and burnt, and then sown with wheat. Barley is usually taken after the wheat, and this is followed by turnips, eaten on the ground, and succeeded by wheat. The first three or four crops on the fresh land were very remunerative, and formed a great temptation to the farmer; but the soil is soon exhausted, and requires expensive management afterwards to keep it up to the mark. It then falls into the usual four or five field course; a piece being laid out annually in sainfoin, to rest for several years before being again broken up. The sheep-fold is shifted daily until the whole space required to be covered is gone over. To economize labour much of the land is "raftered" or half-ploughed, one furrow being turned over on an equal space of ground, the two surfaces of which are thus partially rotted together. Turnips and other green crops are consumed where they grow, which saves the labour of taking home the crop and fetching back the manure. The sheep, as in Dorset, are made the manure carriers for any portion of the land on which it is thought desirable to apply it. Much of the corn-crop is stacked in the distant fields, as it would be almost impossible to carry it home so far with the despatch which is requisite in harvest operations. In many cases it is thrashed where stacked, a travelling steam-thrashing machine being hired for the purpose. The straw is then carried out and spread over the grass-lands from which the clover-hay had been cut the previous year. But a very small proportion of the

root-crop is carried home for consumption by cattle, the number of which on these large farms is quite inconsiderable. According to the quality of the land, and the amount of artificial manure and food expended on it, the corn-crops vary in yield from 20 to 28 bushels of wheat, and about 40 bushels of barley per acre. Wheat is sown from October till the end of September. Spring sowing for wheat is much out of fashion, as on these high lands a late crop is very subject to blight in harvest. The dry cold March winds which sweep over these unsheltered downs often inflict serious injury on the young wheat plant. Barley is sown in March and April, grass-seeds being sown at the same time, and clover-seeds in the Month of May, as, if sown earlier, they would vegetate too rapidly and starve the barley crop. Swedes give the best crop when sown in the month of May, and white turnips succeed winter vetches and rye as soon as the ground can be got ready in July. Wheat-harvest begins generally in the second week in August. It is reaped chiefly by strangers from the more populous districts in North Wilts, by task work, the price varying, according to season and crop, from 7s. 6d. to 10s. an acre. Barley is mown by the regular labourers of the farmer. The turnip-crop is hoed by men at task work—strangers who migrate into the district every season, and work late and early, that they may earn good wages. They are paid from 7s. to 9s. an acre, besides beer, and expert hands can make 3s. to 4s. a-day at this rate, beginning work, of their own accord, at 3 o'clock in the morning, resting during the mid-day heat, and continuing till 8 o'clock in the evening. The artificial manure most in favour for the turnip crop is superphosphate of lime, some farmers having laboratories for mixing bones and sulphuric acid on their own farms. Three cwt. of superphosphate is reckoned a sufficient application for the turnip crop. It is usually drilled in along with the seed, the same machine sowing both. Guano does not appear to be much used on the downs, but on farms of such great extent the sum expended on artificial manures and oil-cake is necessarily large, though greatly contracted within the last two years. On a farm of 2,000 acres the sum at one time expended on these substances reached £1,000 in one year; it has now fallen off about a half, the farmer fearing that a continued low range of prices, with no corresponding abatement of rent, will oblige him to leave the farm, and, there being no custom here to pay an out-going tenant for unexhausted improvements, he has, of course, no interest in maintaining the condition of the land for the benefit of his successors. The land is chalked once in 20 years.

The management of the sheep stock is much the same as that of Dorset, this being also a breeding country. The South-down is the favourite breed, and much attention is paid to the improvement of the flock. On a farm of 2,000 acres of average land 1,400 ewes are kept, from which 1,000 or 1,200 lambs are reared, several hundred lambs being annually lost, and many ewes, at lambing time. The quantity of cattle at present kept on this farm may be about 30 or 40 in the straw-yards, and 10 fattening oxen, with a few milch cows for the use of the farm. There are also 18 working oxen, and

22 farm horses. About 500 acres of corn are grown annually, and 250 acres of turnips. The farm buildings comprise a stable for the horses, and, at a different part of the farm, loose boxes for the working oxen, an engine-house, one enormous barn and two smaller ones, a couple of sheds with yards, and a waggon house. The steam-engine is used to drive a small thrashing-machine, which merely beats out the corn without separating it from the chaff. It is also employed in cutting chaff and bruising corn for the stock of the farm to which that is given. The wheat only is thrashed by the machine, barley being thrashed by the flail, partly to give increased employment, and partly because the maltsters prefer it hand-thrashed. It is then winnowed by hand-fanners, and the beards are knocked off in another hand-machine, worked by two men. But this necessity, which the poor-law imposes, of giving employment is a heavy tax on the farmer, as the whole of these processes could be quite as effectively performed of one operation by a good thrashing-machine, and certainly at one half the cost. The buildings being mostly thatched, and the walls of timber, they are very expensive to keep in repair.

The wages of labour are lower on Salisbury Plain than in Dorsetshire, and lower than in the dairy and arable districts of North Wilts. An explanation of this may partly be found in the fact that the command of wages is altogether under the control of the large farmers, some of whom employ the whole labour of a parish, and in most instances it is divided amongst a very few men. Six shillings a-week, we were assured, was the amount given for ordinary labourers, by the most extensive farmer in South Wilts, who holds nearly 5,000 acres of land, great part of which is his own property. Seven shillings, however, is the more common rate, and out of that the labourer has to pay 1s. a-week for the rent of his cottage. If prices continue low, it is thought that even this wage must be reduced. Where a man's family can earn something at outdoor work this pittance is eked out a little, but in cases where there is a numerous young family great pinching must be endured. We were curious to know how the money was economised, and heard from a labourer the following account of his day's diet. After doing up his horses, he takes breakfast, which is made of flour with a little butter, and water "from the tea-kettle" poured over it. He takes with him to the field a piece of bread and (if he has not a young family, and can afford it) cheese to eat at mid-day. He returns home in the afternoon to a few potatoes, and possibly a little bacon, though only those who are better off can afford this. The supper very commonly consists of bread and water. The appearance of many of the labourers showed a want of that vigour and activity which mark the well-fed ploughman of the northern and eastern counties. Beer is given in hay-time and harvest. Some farmers allow ground for planting potatoes to their labourers, and haul their fuel, which on the downs, where there is no wood, is a very expensive article in a labourers' family. Both farmers and labourers suffer from the present over supply of labour. The farmer is compelled to employ more men than his operations require, and, to save himself, he pays them a lower

rate of wages than is sufficient to give that amount of physical power which is necessary for the performance of a fair day's work. His daily labour is, therefore, really more costly than where sufficient wages are paid; and in all cases where task work is done the rates are higher here than in other counties in which the general condition of the labourer is better. We found a prevalent desire for emigration amongst the labourers themselves, as the only mode of benefiting both those who go and those who remain behind. We incline to think that a sub-division of the large farms on the downs would tend to increase the demand for labour, and, with a low range of prices, such a sub-division appears inevitable. These thin lands cannot be kept in cultivation except by a liberal expenditure of capital and the utmost economy in the consumption of the produce, and this is scarcely compatible with a holding of 2,000 acres under one management. Very few men, even if they possessed it, would risk a capital adequate for the thorough development of such a farm; but, where men of this class are to be found, they would probably get a better return by dividing their land into four or five farms, of 400 acres each, with separate bailiffs vying with each other with the care of the land under their charge, and answerable separately to the capitalist farmer, who would superintend and direct the whole. In the dairy and grazing districts the wages are from 7s. to 8s. a-week.

The opinions expressed by the farmers as to what is requisite to be done under present circumstances, and with future prospects, were of a much more practical character than those we heard in Dorsetshire. In the dairy districts the farmers ask for drainage and better house accommodation, relief from the unequal pressure of poor-rates, caused by the present law of settlement, and the obligation to employ the whole labourers of a parish, whether their labour is needed or not. The income-tax is also much complained of, it being arbitrarily exacted, even when the farmer is actually losing money. This is thought an act of great injustice, and it is not easy to see why the farmer alone should be subjected to an arbitrary assessment, as it is not more difficult for them to strike a balance every year in their accounts than it is for a merchant; and the necessity for doing so would introduce a business-like accuracy of accounts, which could not fail to be beneficial to the farmer himself. On the corn-farms a reduction of rent is considered indispensable, or a conversion of money into produce rents. The idea of a return to protection appears to be abandoned; and, in the dairy districts especially, it is readily conceded that free-trade has much less seriously affected the farmers than their brethren in the corn districts; though they think it right, nevertheless, as one man said to us, to "bear their share in the general grumbling." With the large corn-farmers, however, the suffering is very serious, and much individual loss is unavoidable before matters re-adjust themselves; and it was alleged that the claims on the justice of their landlords were of the strongest kind. As the landlords, in the manner already explained, without any outlay, obtained a large increase to their rental, and by so doing had in some degree become partners in

the scheme, they, when through unforeseen causes it became unsuccessful, are not, in honour, at liberty to withdraw without bearing the same share in the loss as they drew from the profits of the adventure. A deduction of 10 per cent. has, in the meantime, been generally allowed.

DEVIZES, FEBRUARY.

Wiltshire, in an agricultural point of view, is divided into two great districts—the one comprising the north-west and the other the south-east portions of the county. The former embraces a great variety of soils, while the latter is principally occupied by the immense bed of chalk which enters it from Dorset. From this natural partition a divided system of agriculture has arisen—dairy farming and grazing being the characteristics of the one district, while the other is chiefly devoted to tillage and sheep-walk. We propose, in our description of Wiltshire farming, to give some idea, in the first place, of the manner in which the northern and western parts of the county are cultivated, and then to show the state of agriculture on the chalk lands.

The northern and western districts present, with little variety, the usual appearance of a country, the soil of which is devoted to dairy farming and grazing. The land is heavily timbered, divided by hedgerows, and presents to the eye a singularly rich, well clothed, and luxuriant appearance. Even at this cheerless season of the year, when nature wears her bleakest and least kindly aspect, and the reviving energies of the season are hardly felt, the succession of green fields, guarded by stately trees, and extending for miles along fertile and well watered vales, has a most pleasing effect. On a closer survey the land is often found wet and ill-drained, the number of hedgerows is sometimes greater than is at all requisite for shelter, and the quantity of timber larger than it should be; but on the whole there is less ground for complaint in this respect than in Devonshire and Gloucestershire. It seems to be a disputed point how far trees are injurious to pasture land; some people maintaining that they do good rather than injury, while others contend that they absorb the productive qualities which should go to increase the growth of vegetation; and that though cattle seek shelter under their boughs they are not fond of the grass which grows there. However this may be, the farmers appear to regard them as evils, and have of late years diminished considerably the number of hedgerows and the amount of timber growing therein. They are also becoming more alive to the absolute necessity of efficient drainage, and in this respect, though much appears to be still requisite, a good deal has recently been done. Tileries have been introduced, and drains laid with pipes are beginning to supersede those made with wedges of turf. The more liberal landlords supply the pipes, while the tenant undertakes the labour and expense of putting them in. No attention, however, appears to be paid by the former to the manner in which the work is executed, the tenant being, within certain bounds, supplied with as many pipes as he wants, and putting them into the ground as he thinks proper. The consequence, as may be con-

jectured, is that the drains constructed very seldom serve adequately the purpose for which they were intended; and farmers can only attain a knowledge of the art of drainage by a long series of costly experiments, which often disgust them with the work of improvement. Of course the necessity for supervision on the part of the landlord must, to a great extent, be determined by the degree of intelligence existing among his tenants. Where the latter as a body are well educated, they will in some measure be able to dispense with the advice and superintendence suggested; but are the dairy and grazing farmers of the districts which we are describing, as a body, well educated? The size of the farms in this division of Wiltshire is from 60 to 250 acres, occupied on a yearly holding by men whose families on the smaller farms enable them to dispense with hired labour, and who are therefore by their habits little elevated above the condition of the peasantry. The rent paid by them varies from 30s. to 60s. per acre, besides the "outgoings," or local burdens, which in this division of the county are unusually high, adding from 10s. to 20s. per acre to the expense of cultivation. The great pressure of local burdens arises from a variety of causes, which it is necessary to explain, as they are very instructive. In the first place, taking poor rates, it is to be borne in mind that the inhabitants of these districts are a decayed manufacturing population. Handloom weaving and pillow lace working still maintain a languid existence here, and divide the time of the humbler classes with the labours of the field. The farmers hold very cheaply the worth of a labourer who is either a weaver himself or is descended from weavers; and though by the poor law he is compelled to give this class employment, it is generally at a diminished rate of wages. From these peculiarities in the condition of the labouring population it arises that, while their numbers are greater than is required for the purposes of a grazing district, the decaying branches of manufactures on which they formerly subsisted give them no support, and the land obliged to bear the burden of their maintenance does so grudgingly and with a frequent reference to the union workhouse. In other counties we have seen farmers agreeing to employ the surplus labour of their parish, but here that course is impossible from the smallness of the occupancies and the want of capital among the occupiers. Thus the poor rates are swelled up to an unusual height, and their pressure is further increased by the operation of the law of settlement, which saddles one parish with the support of all the labour required for its neighbours, induces large proprietors to diminish the number of cottages on their estates, and throws the whole control and management of pauperism on parishes where property being divided, and the rate-payers less subject to the influences of public opinion, the poor are, therefore, more apt to be subjected to a grinding and unmerciful treatment. We have heard some remarkable illustrations of the evil effects resulting from this state of things in the union of Melksham. Some of the parishes in that union have no pauperism to support, having cast their labourers off upon others—as, for instance, Broughton Gifford, which is very heavily burdened in

consequence. Within the union generally the housing of the labouring population is left in the hands of greedy speculators, who, running up cottages wherever they can obtain leave to do so, get the poor into their power, when arrears of rent become due; and then, as hucksters, supply them with all their little wants at exorbitant prices. With regard to highway rates an equally injurious state of things exists in this part of the county. In some unaccountable manner, either through the carelessness or wilful neglect of the county members for the time being, a most unusual number of turnpike trusts have been created; and, as in many of these, money has been recklessly expended, the country is covered with toll gates, and the pockets of the farmers especially are heavily taxed to meet the claims of the trust creditors. As an illustration of the state of things, we may mention that from Melksham to Bradford and back by Troubridge, a distance of only 13 miles, the traveller has to pay his way through seven gates. The parish of Broughton Gifford is closed in on every side by gates, and for four miles and a half of turnpike road within it there are two toll bars. Notwithstanding the immense number of gates in this division of Wiltshire, the tolls collected hardly suffice to pay the interest of the mortgagees, and thus the whole burden of repairing the roads is thrown as an additional weight upon the farmer in the shape of highway rates. We were informed that Mr. Cornwell Lewis's bill was regarded here as putting all turnpike trusts on a level; and that as soon as it was announced last session, all the solvent trusts proceeded to expend the moneys they had in hand as fast as possible, in order that those which were insolvent should not profit by them. It is easy to understand how much the multiplication of turnpike gates over a rural district, combined with excessive highway rates, must retard its agricultural prosperity, and diminish the profits of the farmer. We have deemed it important to enter thus fully into explanations on the subject of the heavy "out-goings" in the north-western division of Wiltshire. In the course of these explanations, serious existing evils are indicated, the removal of which would, we were informed, be of great benefit to the permanent interests of the landlord, the tenant, and the labourer.

Returning to more direct consideration of the relations between the owners and occupiers of the soil, we were informed that the former have hitherto done very little to improve permanently the land which they let. Many proprietors will do nothing in this way; being content to receive their rents and to allow their tenants to get on as best they can, with farm buildings in every way inadequate to their requirements, and fields, the fertility of which remains undeveloped from the want of drainage. This latter class has generally refused to make any deduction of rent during the present crisis; but the larger and more wealthy landlords, including Mr. Walter Long, have usually allowed 10 per cent. On the estate of Sir John Cam Hobhouse no abatement has been given, as the rents are moderate, and have never been raised by him. Among the conditions of agreement on which farms are held, there is always included one requiring that the consent of

the landlord shall be obtained before grass lands are broken up by the tenant. This condition is kept in full force, but of late years a considerable addition has by mutual agreement been made to the breadth of tillage on inferior soils. The present depreciation in the value of farm produce has put a stop to the encroachments of the plough, and farmers appear disposed to rely more than ever upon their dairy produce and the grazing of stock. Roots are considered very injurious to the produce of the dairy; mangolds being said to give less milk than hay, unless warm cow-houses are provided at the same time. In that respect, however, farmers here are miserably ill supplied. Their yards have a few shelter sheds, but they are of the most rickety and inferior description, and not large enough to accommodate the stock of the farm. The materials of which they are constructed are principally rough wood and thatch, and the manner in which they are erected shows a complete disregard of everything like convenient and economical arrangement. The consequences to the farm management from this are exactly what might be expected. The milch cows are kept during the winter season in open yards filled with a deposit of mud, varying from six inches to a foot in depth. Here, in the midst of filth, the poor animals pass the most inclement portions of the year, their food being supplied to them in great troughs, shaped as curiously as if they had been fashioned in the days of King Arthur. The young cattle that have no room at night in the shelter sheds are of course obliged to remain in the fields. As to any provision for saving manure, it appears never to have been dreamt of, there being no straw to preserve it in a solid state, and the liquid being generally drained into the nearest ditch, pond, or water-course. This is the general rule, though we were told that a marked improvement in the character of farm buildings is at present in progress.

It appears to be the practice of dairy farmers in this district to buy young heifers, principally from Cotswold and Swindon fairs, and after having kept them as milkers for four years, to sell them again, fatted if possible. The price formerly paid for heifers was about £17 or £18, and when sold again in a lean state, £12 or £13 was generally received for them. Prices have now fallen greatly from this scale. As to the amount of stock kept, some idea of it may be formed when we mention that one dairy farm of 120 acres had 40 cows; and that on good grass land $2\frac{1}{2}$ acres are considered sufficient to support a cow throughout the year. The cheese manufactured in this division of Wiltshire is said to be of a very superior quality, and, though sold as the produce of Gloucestershire, brings, we were informed, the highest price in the market. "Double Gloucester," we therefore suppose, means simply Wilts cheese. It is stated that each cow will yield on an average from $3\frac{1}{2}$ cwt. to 4 cwt. of cheese in the year, and 1 lb. of whey butter per week during the summer season, the price of which has been about 7d. At present skim milk cheeses are made, and the best quality of butter, which is sold at 11d. per lb. The best cheeses are now worth 50s. per cwt., being a fall of from 10s. to 15s. on the prices of last year. Skim milk cheeses bring 30s. per

cwt. We examined some of the dairies in the district and found them exceedingly clean and well managed. This department of the farm is generally under the exclusive control of the farmer's wife, and is said to demand great attention, skill, and experience. So important is it considered, that a dairy farmer married to a woman competent in this respect considers himself an exceedingly lucky man; and universally among them this branch of their business is mentioned with the greatest respect. Cheese begins to be made shortly after the calving season, which is in the end of March and early in April. The rich and low-lying pastures in the vales and along the banks of the larger watercourses are usually grazed with fattening cattle, and the principal farmers appear to take a good deal of pride in this feature of their management. With respect to their arable land, the dairy farmers grow, where the soil is strong enough to bear them, crops of roots and wheat alternately, while on lighter ground the rotation is usually clover, wheat, and barley or oats. The average yield of wheat on one farm we visited was, we were told, 32 bushels. Very little artificial manure is used. In our description of the state of farming in this district we must not omit to notice the custom which prevails of hiring implements, such as threshing machines and drills. The threshing machines used are driven by hand, and employ four men and a boy, six sacks being considered a good amount of work to get through in a day. We saw one of these machines at work, and along with it a very extraordinary farming machine, which we despair of describing. It was turned by a man at each end, while a third shook the riddle, and formed altogether a very curious relic of the husbandry of former ages, and must have been invented so far back as the age of Queen Elizabeth.

BASINGSTOKE, HANTS, Feb., 1850.

This county, like others which we have visited, presents a great variety of surface, and is therefore somewhat difficult to deal with comprehensively; but for our purposes it may be divided into two great districts—the southern, which is principally occupied by beds of clay and gravel, with a superincumbent staple varying in depth according to the level of the country; and the central and northern, the chief feature of which is the great chalk formation, but which has also, where the county impinges upon Berkshire, a tract of woodland soil, where the clay and gravel of the southern district again show themselves. The external features of the country undergo changes corresponding with those of the *strata* which occupy it, being well wooded, fertile, and amply supplied with water in the south and north, while on the chalk formation the number and size of the trees diminish, the landscape has a comparatively bare and open appearance, the ample flow of refreshing streams disappears, and nature, for the vegetation which she yields, seems more indebted to man than to her own unaided energies. As the aspect of the country changes so do the methods of cultivation, and the condition of the agricultural classes undergoes corresponding modifications. The farms in South and North Hampshire are from 200 to 500 acres in extent, while in

the chalk districts they rise from 500 to 1,000, 2,000, and even 3,000 acres. In both divisions lands are very generally held from year to year, but this is more common among the smaller farmers, who appear to be either less able or less anxious to secure from their landlords a guarantee for the protection of their interests. The chalk districts being considered independent of drainage, no demand has been made by the farmers there for assistance in that respect; but on the clay soils the arrangement usually adopted has been that the landlord should furnish the tiles, while the tenant undertakes every other expense connected with the placing of them in the ground. We, however, found many instances in which the owner of the soil did nothing in this way, the tenant being left to deal with the land as the amount of his enterprise, his capital, and his confidence in the security of his tenure might suggest. The consequence has been that large and valuable tracts in this country remain saturated with stagnant water; or where attempts have been made to remedy this evil, they have proved very inadequate, the drains being either improperly laid, or constructed with the least efficient materials. The low grounds of South Hampshire are much exposed to injury from the great body of water absorbed by the surrounding chalky uplands. During wet weather the rain descending upon these uplands is precipitated towards the sea, and in its course overflows the unguarded banks of streams, and floods the rich meadows and fields which adjoin them. Nor is this evil confined to the inland country, for there are numerous creeks and inlets along the coast which might be easily reclaimed and cultivated, and which at present are mere receptacles of mud, poisoning the atmosphere during low water, and disfiguring the aspect of the surrounding country. Turning from the subject of drainage to the character of farm buildings in Hampshire, we found in this respect little of which the county has reason to be proud. The principal feature of each homestead is a huge barn, constructed of wood, with a thatched roof, and made large enough to accommodate the immense stacks into which the corn crops are collected for security. These stacks when thrashed out yield on an average about 300 bushels. The accommodation for cattle is larger in the south than on the chalk lands, where sheep are the principal stock, but even in the south the farmers complain loudly as to the inadequate extent and character of the cowhouses provided for them. If they have leases, they are bound to keep them in repair, however difficult it may be to do so; if they are tenants from year to year, they must still provide shelter for their stock; if they have not sufficient accommodation, they are often themselves obliged to build; and sometimes where the landlord engaged to put the premises in good order on the entry of the tenant, he is charged with having neglected, and even refused to do so. One gentleman produced to us written documents, showing how his landlord's agent had refused to fulfil the agreement as to farm-buildings under which he had entered on his tenancy, and how, protected by his lease, he had compelled performance. Another farmer informed us that his farm-buildings had been left in a ruinous state by the preceding tenant; that a considerable

sum had, in consequence, been recovered by the landlord for dilapidations; that he had been promised that the buildings would be placed in efficient repair when he entered on possession, and that the promise had never been fulfilled. To the usually wretched condition of farm-buildings in Hampshire must be added the waste of straw in the yards, and the manner in which the liquid manure is allowed to drain off into the drinking pond or nearest ditch or water-course. Two or three cows and half-a-dozen pigs are the usual occupants of these yards, which have about them a general air of discomfort and defective arrangement which it is scarcely possible to reconcile with the idea of careful farming.

The *agriculture* of that part of South Hants including the area drained by the rivers Test and Itchen, which fall into the Southampton Water, is of a varied character. Much of the land adjoining these streams is in water meadow, the greater or less proportion of meadow attached to each arable farm giving the distinctive character to the mode of husbandry pursued on it. Formerly these water meadows were very valuable, as they enabled the farmer to bring on the earliest lambs for the London market, and then yielded him a crop of hay. The use of artificial food for rearing stock in less early counties has deprived the Hampshire farmer of the monopoly of the lamb market, while the introduction of railways and the cessation of coaching and posting have greatly curtailed his market for hay. Farming is, therefore, somewhat in a transition state here, some of the holders of land turning their attention more to the dairy, some to a mixed system of dairy and feeding, but all, more or less, to the feeding of sheep in winter and the rearing of early lambs. In many instances the water meadows are not now made the object of so much careful attention as formerly, and their very scant produce in some cases (little more than a ton of hay per acre) indicates either that the meadow is ill-managed or not well adapted for the purpose, and that in such cases it might be turned to more profitable account by being drained and converted to arable land. The soil of many of the meadows is a peat and peaty loam, while the adjoining land is a rich loam of variable depth with a few flints in it, lying on a bed of gravel. The depth of the soil varies from a few inches to several feet, and generally it is all naturally drained by the *substratum* of gravel. The farms are divided into large fields by convenient hedges, with a few trees here and there, which add to the beauty of the landscape without doing any material injury to the farmer. Strong clay land is occasionally met with, and farming there is very backward, little having yet been done in drainage, though that is now beginning to excite attention. The rising ground is of a more sandy character, well adapted to sheep feeding, while some of it is good green crop land on a "burning gravel," very subject to serious injury by a dry hot summer. The farms vary in size from 100 to 450 acres, 300 being the average extent. The rent ranges from 20s. to 40s. an acre, according to quality of soil and locality, and the rates and tithes are about a fourth more. Fine fertile dry loam, close to the line of railway, and within a few miles of Southampton, costs the

farmer for rent, tithe, and all rates, from £2 2s. to £2 12s. an acre. The average produce of such land is 34 to 36 bushels of wheat, and 40 bushels of barley. Clay land in the same locality costs the farmer 26s. to 28s. an acre for rent, tithe, and rates.

The four-field system is recognized as the custom of the country, and it is that which is generally followed. But where land is let on lease the farmer is sometimes allowed great latitude, no restriction being made except for the last two years. In such a case he usually takes wheat after a portion of his root crop, as well as after his seeds, substituting it for barley where the ground is early cleared by the sheep, or where their treading in wet weather causes the land to turn up "unkindly" for barley. Occasionally, when the summer proves too dry for a plant of swedes, the land is bare fallowed, and sown with wheat in autumn, the wheat in such cases being followed by barley. The "seeds" are usually covered with farm-yard dung during the winter for early in spring, and this insures a good crop of hay, besides enriching the land for the succeeding crop of wheat. Immediately after the first crop of hay is cut from the more clayey description of land the ground is ploughed, well dragged, then again ploughed in autumn, and after being reduced by the drag and harrows, the wheat seed is sown with the drill. In most cases, however, a second crop of clover is taken, and the wheat sown on one furrow. Early in November is reckoned the best time for sowing wheat, spring-sown crops being somewhat precarious, though occasionally very successful. Artificial manures are never applied as a top dressing for any corn crops. In the vale of the Itchen the swedes are the best crops of that kind we have yet seen in any of the southern counties, but they want that regularity of size which is the sure test of a heavy crop. Two cwt. of superphosphate per acre is the common application to the turnip crop, some adding a few bushels of rough bones, and occasionally a few loads of well-rotted dung. A heavier application of manure would, in our opinion, be found in the end a more economical practice, as rent, rates, and labour are nearly the same in amount per acre whether the crop is good or bad, and an increase of 6 or 8 tons of swedes is therefore cheaply purchased by an extra expenditure of 20s. on artificial manure.

On the chalk lands from Winchester to Basingstoke the mode of farming is very much like what we have already described as practised on similar soil in other counties, only that the quality of the land being generally somewhat better, and the face of the country somewhat warmer here, the acreable produce is greater, and the style of farming more generous. The rent varies from 10s., 15s., 20s., to 30s. an acre, the rates and tithes adding about a third more. The country surrounding Basingstoke is a fine fertile tract of dry arable land, of no great depth, but laid out in large well-fenced fields, suited for the growth of all descriptions of crops, intersected with excellent roads, and having the convenience of a railway station within a couple of hours of London, and for this the average rent per acre, including tithes and rates, does not exceed 30s. 34 bushels of wheat, and 40 of

barley, may be reckoned an average produce, though 40 of wheat and 50 or 60 of barley in favourable seasons are occasionally reached. The grain crops are this year much more remunerative than last, both from their greater yield and superior quality. The loss sustained here by the cold summer and wet harvest of 1843, which rendered the scanty crop nearly unsaleable by the injury done to it before it could be carried, is telling heavily on the farmer now. The four-field course is the rule of the country, to which there are partial exceptions. Sheep-feeding is the sheet anchor of the farmers, and it is carried on in a better or worse style, according to the means at their disposal. A few use cake and corn extensively, in addition to roots and green food, both summer and winter, but the great proportion of occupiers cannot afford to do so, and continue to feed their flocks on the green crops produced by the land, without aiding them even by the use of the turnip-cutter. A sheep to the acre all round, or 500 sheep on a 500-acre farm, are considered to insure good farming. Very few beasts are kept; indeed, there is seldom anything in the yards but the milch cows for the use of the farm establishment, the work-horses, and a few pigs. But a small proportion of the turnip crop, therefore, is drawn for consumption in the yards, the farmer depending chiefly on his sheep stock for manure and for profit. The sheep are managed differently on different farms, some keeping them for rearing fat lambs, others for wethers. In many cases the shepherd has a hut beside the fold, which moves about with it, and in which he sleeps at night, ready to turn out and give assistance should occasion require. The bells on the necks of a few sheep in the flock give him notice when anything disturbs them.

Pig feeding we found in favour with some farmers, as being at present the best paying stock. One farmer we visited has from 40 to 50 breeding sows, which he keeps in a very cheaply-fitted-up yard and sheds, feeding them on swedes alone till they are nearly about to litter. They are then placed in separate pigstyes, and supplied with more generous food. The progeny are kept till worth about 20s. each, when they are sold. A young sow pig can be bought for the same price as an ewe; the ewe produces only one lamb in the year, while the sow brings on an average two litters of seven or eight in each, or 14 to 16 pigs annually. Hence our informant considers the sow by much the most profitable investment for his money.

The soil, climate, and situation of Hampshire afford several sources of emolument to the farmer, of which he does not appear to have yet fully availed himself. The populous towns on the south coast, Portsmouth, Gosport, and Southampton, are excellent markets for the consumption of his vegetable as well as animal produce. Yet we found that in the article of potatoes these parts are chiefly supplied from the coast of France. Considering the abundance of manure obtained from these towns, and the fitness of much of the soil for potatoes, we think the farmers somewhat remiss in letting this trade out of their hands. The earliest crops in England might be produced here, which could be off the ground in ample time to be fol-

lowed by a turnip crop the same season. The northern part of the county could in like manner, with the aid of the railway, send supplies to the London market; but as the same sources of manure are not within reach of this division, the farmer would probably find it to his advantage to house-feed stock extensively for the purpose of increasing his dung-heaps. This might be united with the introduction of dairying, by which to send daily supplies of milk and butter to the London market. And from these sources, viz., the culture of edible vegetables, and the sale of milk and butter, we have a strong impression that the difference in the price of his corn would be amply made good to the farmer.

There is another branch of industry which the convenience of railway accommodation and the movement for sanitary reform are likely to introduce in this and other counties at a moderate distance from the large consuming towns of the kingdom. The rapid transit now afforded has put an end to the necessity which formerly existed of sending cattle up to town, to be driven through the crowded thoroughfares, to the inconvenience and danger of the passengers, and afterwards slaughtered, to the pollution of the atmosphere, and the absolute waste of one of the most valuable sources of reproductiveness. Should Smithfield be abolished, the farmer's market will be brought nearer his own door, the carcass butchers removing their establishments to convenient points on the different lines of railway, to which cattle can be driven without unnecessary cruelty, and whence the meat can be delivered in London with nearly as much despatch, and certainly in a more wholesome state than from the city slaughter-houses; while the blood and other offensive matter, instead of going to waste, will be carefully retained for the benefit of the soil.

The rate of wages for labour in Hampshire is at present from 8s. to 9s., and even 10s. per week, the higher scale prevailing in the southern districts and the lower on the chalk lands. Task work is extensively resorted to by the farmers, and, on the whole, the labourer is better paid than in the adjoining counties which we have visited. We were told, however, that in many cases he is not better off or more comfortable on that account than elsewhere, having to pay an increased rent from the scarcity of cottage accommodation. This scarcity arises from the effect of the law of settlement, which has induced the landlords in some parishes to pull down, whenever they had the opportunity of doing so, all buildings that were likely to afford a harbour for the poor. The consequence has been that the labouring classes in Hampshire have had their families unduly crowded together, to the great detriment of their morals, as we were informed. The rent of cottages, which in many of the surrounding counties does not exceed £3 per annum, here rises to £5 and £6, and in some cases even to £10 a year, and to this unavoidable source of expense the farmer points as the explanation of the present rate of wages paid.

In Hampshire we found repeated the same complaints as to the operation of free trade and the same cry for a return to protection which we heard

in other counties. The farmers do not appear to entertain any strong hope that it will be restored to them, and yet they express themselves quite at a loss how otherwise to seek for relief. They speak of leases, produce rents, compensation for unexhausted improvements, deductions of rent, the abolition of the law of distress, and such-like changes as more or less likely to afford some relief, but neither to the whole nor to any one of these measures do they as a body appear to look for effectual aid. Their system of farming they consider to be the best that can be adopted by them, and to be incapable of modification in any material degree so as to increase considerably and with profit to themselves the produce of the land. A general want of capital is admitted to exist among

them, and this was mentioned to us as one of the principal evils from which they suffered. We were informed that many of them took farms which they had not more than half enough money to stock and manage, and that the injurious consequences of this state of things, even in the most prosperous times, were greatly increased during the present pressure. Some farms we were told had been given up in despair to the landlords and remained unoccupied, while others had been re-let at diminished rents. The number of such cases, however, was not considerable from what we were able to learn, and the great bearing of distress appears to be upon tenants whose necessities make it impossible for them either to meet their landlords or to quit their holdings.

(To be continued.)

HIGH FARMING IN AYRSHIRE.

INSPECTION BY THE ST. QUIVOX CLUB.

The time has been when an incursion of fifty or sixty mounted yeomen into Carrick would have been associated only with deeds of foray and rapine. How different the spirit which actuates the parties who join in rural excursions at the present day! The sword is indeed turned into a ploughshare amongst us, and men of energetic minds—instead of, as in the “good old times,” finding their chief delight in despoiling their neighbours—now occupy themselves in overcoming difficulties of soil, climate, and situation, and in contributing to the maintenance of peace and plenty in the land.

The annual inspection of farms by the St. Quivox Club took place on Wednesday, the 7th of August last, and, as the route which had been marked out was in the highest degree interesting, there was a numerous attendance of members. A few strangers, some of them from a distance, joined the party, and by the time they reached Myremill there was a party of about sixty on the ground. In the company we observed James Campbell, Esq., of Craigie, President of the Club; Alexander Oswald, Esq., M.P., Auchincruive; John Bell, Esq., of Enterkine; — Whitmore, Esq., Bridgnorth, Shropshire; David Campbell, Esq., Mounthamilton; Capt. De Butts, Falkland House; Capt. Balfour; Alex. Ralston, Esq., Dunduff, Vice-president of the Club; Thomas Dykes, Esq., Maybole; A. B. Telfer, Esq., &c., &c.

The muster took place at Cuning Park, at half-past eight, and an hour was passed there looking over Mr. Telfer's houses and grounds. We cannot in the meantime give a minute description of the various objects of interest which attract the attention of visitors at Cuning Park; but we may perhaps recur to the subject at some future opportunity. It is entirely a dairy and green crop farm, no grain whatever being grown upon it. The early situation, and the light high-conditioned soil, render it suitable for the growth of potatoes for the early market; and a crop of mangold wurtzel is grown after these are removed. The remainder of the green crop-

ping land is planted with an earlier crop of mangold. With good management, in an early situation, this description of crop not only gives fully a larger amount of food than turnips, but it is also more suitable for dairy cows, as it does not impart a taste to the milk or butter, and it admits of a portion of the leaves being carried off in autumn for feeding. The part of the farm not devoted to green crops is under Italian ryegrass, a considerable proportion of which has already been cut three times. The whole extent of the farm is fifty-five imperial acres, and it maintains a dairy of thirty-six heavy Ayrshire cows. Mr. Telfer's maxim is, not to take too much in hand, and to do everything thoroughly well. And we must do him the justice of saying that he does not belong to the class who lay down rules without acting up to them. Every spot of his ground is in the highest condition; everything about his stead is a model of orderly arrangement, and shows a taste so exquisite that it approaches to the fastidious. The byre is a wide capacious building. The cows stand in two rows, with their heads to the centre, and there is a roomy passage down the middle, between the rows, for feeding them. Behind the kerb-stone the droppings fall on a perforated metal plate, and a drain below carries the liquid to the tank. This drain can be scoured with water whenever it is thought advisable to do so, as there is an unfailing supply of water pumped from the river Doon. The passages before and behind the cattle are neatly paved, and the walls a few feet up are covered with slates, so that they can be washed down and the atmosphere of the building kept in a state of great purity. The cows lie upon cocoa-fibre mats, and these, along with a very little litter, suffice to keep them clean and comfortable. The commodious milk-house is well lighted and ventilated from the north side, and has quite an air of elegance about it. The ceilings are neatly corniced, and the walk between the centre-bench and the side-shelving is covered with wax-cloth. A naturally

slovenly person could not think of being otherwise than cleanly in such a place. The dairy altogether appears to be admirably adapted for the manufacture of the nicest butter, to the manufacture of which, indeed, in the cleanest and most approved way, as the chief produce of the farm, all these arrangements are directed. The steam-engine is called upon to assist in the work of the dairy. It drives the churn; and the escape-steam, by a pipe, boils at any time, in the course of five minutes, the water in a large trough for cleansing the dairy utensils. The food for the cattle is cooked in large cylinders by steam from the engine. These cylinders are hung by the centre, and are easily inverted and emptied into a cooler, which is wheeled in below them. Besides this, the engine does a variety of work, such as driving chaff and turnip or mangold cutters, and working the force-pump, which impels the liquid manure through cast-iron pipes, and distributes it on the field by means of gutta-percha hose, as at Myremill. The solid manure of the farm is all prepared and kept under cover. Mr. Telfer has made various attempts to dissolve portions of it, that it might afterwards be sent by steam power through the pipes; but hitherto he has not been very successful. We left Cunning Park with the impression that, if Myremill be the grand experiment of the day in regard to the economy of farm-manure, Mr. Telfer is working out the most perfect illustration of a truth which is not sufficiently attended to—that in agriculture a given amount of capital is most profitably expended on a moderate extent of land. The amount that is annually realized by sales of produce from these fifty-five acres would surprise many who do not contrive to sell as much from farms five times the extent.

The morning was beautiful, which added to the enjoyment of a drive through the rich agricultural country along Carrick shore, from Cunning Park to Dunduff. The scenery for a few miles after crossing the Bridge of Doon is peculiarly lovely, and on ascending the higher grounds towards the new farm-steading of Lagg, it becomes still more delightful. From this point the view on such a morning cannot be easily surpassed. The noble bay of Ayr, studded with vessels, lay calm and serene beneath us; and, wherever the sun shone through the openings of the fleecy clouds, the sea glistened like a mirror; right before us a part of it looked as if broken into an inland lake by the abrupt eminence of Bowerhill, and the confined view to the right rested on the rich fields of Greenan and Spring-garden. Farther on, the fine spire of Ayr, with the best part of the town, and the elegant villas to the south, looked charming in the morning sun, while the fertile country beyond in the direction of Monkton and Dundonald formed a pleasing background to the landscape. On the other side of the bay to the left, the blue hills of Arran rested in their majesty, and far onwards the Cuninghame hills loomed through the distance. The impression of such a view is not effaced from the memory for years.

According to invitation, the numerous gathering on reaching Dunduff were hospitably entertained by Mr. Ralston, to breakfast. They afterwards set out with re-

newed alacrity to inspect the young house-fed cattle, &c., about the steading. About fourteen years ago, Mr. Ralston sowed a five acre field with a variety of meadow grasses, and laid down the land in the proper form for irrigation with the liquid-manure for the farm-yard diluted water, of which he has a sufficient supply. It has been done at a small cost, and has paid extremely well. In good years he has taken as much as sixty tons of grass from an acre of land; and during the present season, the field has kept thirty cattle and sixteen horses since the third of May. Mr. Ralston is satisfied that this is not the most economical method of using the manure. The irrigation takes place mostly in winter, and the manure is put upon the land in a fresh, unfermented state; and when the ground has been thoroughly saturated before summer sets in, there must be a loss by exhalation. But the experiment has been useful, not only as affording a rich return, compared with previous wasteful methods, but also as giving a convincing proof of the value of the liquid manure of the farm as a fertilising agent in the production of the succulent grasses. It is only at the commencement of a lease that a tenant, unaided by his landlord, can adventure a more expensive process. On the neighbouring farm of Lagg, into the possession of which Mr. Ralston entered at Martinmas, 1848, he has built tanks and intends laying cast-iron pipes for conveying manure by gravitation to from 40 to 50 acres. In this instance there is the unusual advantage of a fall of eighty feet from the bottom of the tanks to the fields, and it is believed that such a fall will prove sufficient to throw a good jet from the hose. This is a very enterprising attempt on the part of a tenant, and strangers may rightly regard it as an evidence of the excellent spirit which actuates the better class of our Ayrshire farmers. We have no doubt there are others who incline to make similar spirited attempts; but in too many instances there are such a number of drags on the incoming tenant's capital, in the shape of permanent improvement, that he cannot accomplish all that he may desire to effect. Mr. Ralston has already all but completed two tanks, each capable of holding 20,000 gallons. They are circular in form, built with bricks made on purpose, and laid in Roman cement; and the cost of each tank is about ten pounds, independent of cartage. One of the new byres at Lagg is constructed to hold thirty-six fattening cattle in a single row, with a passage behind, and another before the cattle. Rails are laid on the passage in front to facilitate the feeding, and it is found that one man can do the whole work connected with the byre. On the visit of the Club to Lagg it was matter of general remark the extraordinary change that had been effected in the appearance of the farm during the short period of Mr. Ralston's occupancy.

After leaving Dunduff, the Club proceeded by way of Drumshang and Humeston to Lyonston, where they were gratified with a view of Mr. Findlay's stock of Ayrshire cows. The crops along the line of route looked well—the green crops in particular showed superior cultivation; and the proper culture of turnips is always one of the best evidences of superior farm-management. The good folks of Maybole seemed to be not a little astonished by

the unexpected procession through their town of such a lengthy train of carriages—upwards of twenty in number.

The club arrived at Myremill about two o'clock, and immediately proceeded to inspect the works on that famous farm, which is now an object of interest to so many enterprising agriculturists in all parts of the United Kingdom. Additional byres have been built on the best principle for the accommodation of upwards of a hundred fattening cattle; tanks have been constructed with capacity for 300,000 gallons of liquid manure; cast-iron pipes have been laid for conveying it to 400 acres of ground; and a twelve-horse-power steam-engine has been erected for moving the force-pump and the thrashing and winnowing machines—working the chaff and turnip washer and cutter—the linseed and corn bruiser—cooking the cattle food—and doing generally every description of work to which it can be economically applied. It may be regarded as an experiment on a grand scale of the propriety of collecting the liquid manure of the farm, allowing it to ferment, and afterwards distributing it on the fields by steam power for the purpose of growing succulent plants for house-feeding. An unfailing supply of water is requisite for carrying out such a plan steadily, and this has been attained by bringing it in pipes a distance of nearly a mile. The mere falling of abundance of water on well-drained land during warm weather, of itself encourages very much the growth of grass. So far as the experiment at Myremill has yet been carried, Mr. Kennedy has every reason to be satisfied with the results. One field, which was sown with Italian rye-grass about the 1st of May, has been pastured with sheep. It was three times dressed with diluted liquid manure; from five to six tons were applied on each occasion. A flock of sheep, in the proportion of twenty to each acre, were put on the field on the 10th of June, and, with the exception of one week, they have been pastured on it ever since. The field is divided into two by flakes. We think that it is of much importance to have more numerous divisions, and, if possible, to have the sheep always at night on a recently fouled division. The common remark of farmers on seeing such a numerous flock is, Will not the sheep rot here? Mr. Kennedy can only reply that the question remains to be solved, but that as yet there are no indications of such a disease. An adjoining field, which was sown after the middle of March, has been cut three times for house-feeding. On a part of it which was cut nineteen days before the visit of the club, the Italian rye-grass had grown, in the course of that time, to the length of two feet, and was running to seed. Mr. Kennedy is better pleased with this field than with the other where the sheep are going, and he ascribes the difference to the varieties of grass sown upon them. That which pleases him best is the variety which Dickenson, of London, has selected and cultivated with much care; the other is an importation from Leghorn. In another field the workers were busy carrying off a second cut of grass. It was a remarkably close heavy cut, the stalks of grass measuring four feet in length. The different visitors appeared to be highly delighted with all that they saw, and some of them who came under a different im-

pression returned with the opinion that, judging from present appearances, there was a reasonable prospect of a good return for the outlays at Myremill. The whole day's inspection was very gratifying, and without being disposed to exalt our own district in an unreasonable degree, it may not be too much to remark that it is doubtful whether there is any other part of the country in which so much might be seen within the compass of an easy two hours' drive that is of such surpassing interest to the intelligent agriculturist.

DINNER IN MAYBOLE.—After the work of the day the members of the club, with a number of the other visitors, dined in Maybole. Mr. Campbell, of Craigie, officiated as chairman; supported by Mr. Kennedy, Myremill, who had been specially invited by the club; Mr. Bell, of Enterkine; Mr. Telfer; Mr. Whitmore; and Captain Balfour. Mr. Ralston discharged the duties of croupier; supported by Mr. M'Caw, Morriston; Mr. Dykes; Mr. Rennie, banker, Maybole; and Mr. Kennedy, Lochlands.

After the usual preliminary toasts,

Mr. CAMPBELL, of Craigie, said: We must all be much satisfied by the application of liquid manure to the soil, which we have seen upon Myremill to-day, and with the high cultivation of the farm. We have heard much from the chemists of the value of liquid manure, and farmers have often been blamed for not bestowing sufficient care in preserving it, and in not paying sufficient attention to the mode of its application to the land; indeed, they have been charged with valuing it too lightly and paying too little attention to the information afforded them, regarding manures, by scientific men. This complaint cannot be justly made of Mr. Kennedy. In so far as liquid manure is concerned, he has attended to all the suggestions of the learned upon the subject, and has spared no pains in endeavouring to reduce their precepts to practice upon a scale which must give the fairest trial to the value of their theories, and that I trust with every prospect of bringing from them a successful result. It is exceedingly encouraging to meet with an experiment of such importance, likely to lead to so great an increase in the produce of the soil; the more so, as we have not all been successful in the experiments we have made under the guidance of agricultural chemists; and as even in some instances where success was said to have attended them, that success, it is to be feared, must be imputed partly to accidental causes, as we do not find that the specific manures to which such great effects have been attributed have come into general use in those districts in which they apparently produced such celebrated crops. It is difficult to suppose that their use would have been abandoned had it been clear that the great increase of crop obtained was derived from their effects, and not contributed to by other causes. Farmers began rather to lose faith in agricultural chemistry—they began to think its pretensions were too high, and that its teachers were unsafe guides. I am sorry to see that a correspondent of the *Times*—not, I feel convinced, the ordinary agricultural correspondent of that paper—has found fault with the lecture delivered by Dr. Anderson to the Highland Society at Glasgow. Nothing, he said,

that he heard was new : it is comforting, however, that he admits that all he heard was good ; and as to all not being new, it is believed that few people who have been in the habit of reading works on agricultural chemistry have found much, of late, besides repetitions of what has been previously written. The truth seems to be that agricultural chemists have already given us more information than they have been able to teach us how to apply to use. They have told us the constituent ingredients of all the crops we raise, and they have pointed out the substances containing these ingredients ; but they have not yet shown us how we are, independent of organic manures, to present them to the growing vegetables in such a state that they can be taken up and assimilated by them—a consummation much to be desired. Liebig himself has failed in doing this ; and, after such a failure, can we blame Dr. Anderson for being cautious ? That caution will better serve the cause of the science which he promotes than if he were, through a desire to strike out a new path for himself, to put forth notions which might lead the farmer into unnecessary expense. It is complained by this writer that, in the lecture in question, the value of farm-yard manure was insisted on, but no hint was given for increasing it. The different qualities of farm-yard manure, as affected by different kinds of food given to animals, was treated of ; but no definite or economical conclusion was pointed out. The propriety of covered dunghills was advanced ; but the farmers were at the same time warned not to let the expense outrun the profit. Then, no definite clue was given either as to expense or profit. All the matters on which this gentleman requires information are such on which, if he be a farmer, he ought rather to furnish information himself than to demand it from a chemist. With all respect for the science of chemistry, can any one doubt that the experience of a farmer is a better criterion of the best mode of increasing farm-yard manure than any experiment that can be made in the laboratory ? It may be possible, for aught I know, to test the relative value of manures made under cover or in the open air, from cattle fed on oilcake or not, by analysis in the laboratory ; but I am pretty certain that no practical farmer would place so much confidence in such an analysis as on the result of the application of farm-yard manure, made in different ways to different portions of the same species of crop on soil of the same nature. I have not heard of any such experiment being made, though I believe you will agree with me that it would be the true way of proving the superior value of manure made in the one way or the other, if there be superiority in either case. The writer to whom I have alluded could not help thinking, while he listened to the lecturer, that every now and then he was coming to some valuable conclusion which he was not at liberty to utter. Well, gentlemen, at all events, Mr. Kennedy has not concealed his knowledge from you to-day ; he has laid all he knows on the subject of manures open to us, and the skill and perseverance with which he has carried into effect the great undertaking in which he has engaged will, I hope, prove profitable to him, as I am sure

they reflect the highest honour upon him as an agriculturist. I beg that you will drink to his health and prosperity, with all the honours.

Mr. KENNEDY replied in suitable terms.

Mr. WHITMORE, having been called upon by the Chairman, next addressed the meeting. He had no hesitation in saying that the experiment at Myremill was one of the greatest experiments in Britain. He had come from Shropshire for the purpose of seeing it, and had derived great satisfaction from his visit. His attention was first directed to liquid manure by observing its powerful effects in gardens, and afterwards by experiments in a Union Industrial School in his neighbourhood, where it was accumulated, and where its application to green crops produced wonderful results. His first attempt to run out the liquid manure of the farm to the fields was with wooden tubes ; but he found that these would not do—there was too much leakage. Mr. Huxtable had tried clay pipes, made on purpose, and he intended to follow his example. The chief argument in favour of these was their cheapness. There was likewise the question, whether cast-iron pipes would corrode. He hoped they would not, when laid into the ground and air excluded ; but he was not quite sure about it, and this was the only doubt which he entertained in regard to Mr. Kennedy's plan. Manure might be made all the year round by soiling, as Mr. Kennedy was doing. Such a plan nearly doubled the animal manure of a farm. The manures compounded by chemists had not come up to his expectation ; farm manure must still be mainly depended upon, as it contained everything required by the plant. But we can only get enough of this by summer house-feeding, and preserving the liquid manure. Any description of crop may be manured by the liquid, but the greatest benefit is derived from its application to Italian ryegrass in summer. He preferred the plan of impelling the liquid through the pipes by steam power to the gravitation principle, even when the fall was considerable. He had tried it unsuccessfully by gravitation ; but in his case the fall was not great—not more than fifteen feet. He was much disposed to think steam-power essential to the success of such attempts. A good supply of water was of great moment. He collected into a reservoir all that fell on his yards and buildings, for mixing with liquid manure. And it was necessary for mixing with the solid dung, to aid in dissolving it, that it might be sent through the pipes. The solid manure was difficult to dissolve on account of the litter. Mr. Huxtable thought it better to pass all the straw through the animals, and, in order to do without litter, he tried the plan of feeding on boards. In this he had not succeeded well. Large cattle were apt to strain themselves upon them, and they had an appearance of fear and discomfort which was not desirable in fattening cattle, and which tended to prevent them from thriving. Mr. Huxtable had a tank with a grating over it, upon which the dung was laid—the greater part falling through, and the straw being afterwards raked off. He had himself used sand successfully as bedding, and he found the manure which was thus made good for strong land. It was plain that we must exert ourselves in these times. He did not

wish to say a word on any subject that was excluded from discussion by the regulations of the club; but he might, perhaps, be allowed to remark that there was a law which applied to every description of produce—he meant the extraordinary development of human energy and intelligence since the Peace, which has tended to effect a reduction in the price of everything. For his own part, he farmed 600 acres, and had no fears. He lately travelled through France to see the state of agriculture in that country; but he found it much inferior to ours, and with little appearance of improvement. During the last two seasons we have had great importations from France, nothing at all like them having occurred since 1810. This has partly arisen from a succession of unusually good harvests, and partly from a diminished consumption, caused by the unsettled state of the country. He took occasion to make enquiries about prices. The farmers told him that they used to get 25 francs per hectolitre for their wheat, and they can now get only 14 francs. On asking a farmer what was the reason of this fall, the answer was—"It is the Republic." They had no alteration of laws there on which to lay the blame of the depression. The same complaints which exist in France might be heard throughout the continent, and farmers in every country had reasons of their own to assign for it. His own belief was that it was caused partly by extended cultivation, induced by the high prices of recent years, and partly by repeated good harvests; but, as the grain trade had thus been brought into an exceptional

state, he did not think there was reason to suppose that the depression would continue long. At the same time he thought they might expect a lower range of prices than heretofore. He concluded by saying that it had given him great pleasure to see the experiments of Mr. Kennedy, at Myremill; and this pleasure had been much enhanced by his unexpected meeting with the St. Quivox Club.

The CHAIRMAN proposed the health of Mr. Whitmore, and the toast was cordially received. Mr. W., in thanking the company, said, that if any gentlemen should visit Shropshire, and have a wish to see similar experiments to those at Myremill, but on a smaller scale, he would be happy to show them his farms.

An interesting conversation followed on the subjects which had come under observation during the day. In regard to the corrosion of cast-iron pipes, Mr. Telfer said that the liquid left a sort of coagulum upon the metal, which might possibly prevent any such result; and Mr. Kennedy stated that after the usual distributions, he pumped them full of water to exclude the action of air. Want of space prevents us from giving further remarks of these and other gentlemen. There seemed to be a general feeling of pleasure at the magnitude of the returns which are attainable under the new system, and an idea that the experiment at Myremill will prove, as we predicted nearly two years ago, "an era in the agricultural progress of Ayrshire."—Ayr Advertiser.

IRRIGATION BY LIQUID MANURE.

We observe that the prize essay on the "Best mode of saving and applying Liquid Manure of Farm Steadings," by Mr. James D. Ferguson, land agent and agricultural engineer, in Glasgow, is now published by the Highland and Agricultural Society in the "Quarterly Journal of Agriculture" for July; and it may not be out of place to give a short summary of those recommendations so interesting to farmers.

To understand the subject the article should be read itself, more especially as there is a pretty full description of an excellent farm standing for a breeding stock, a design for which is given, well worthy the attention of landed proprietors, as the proper drainage of the various houses is shown on it by dotted lines. We may state, in general terms, that the dwelling house is situated on the south of the offices, and the barn on the north; but in place of its being in line with the houses on each side of it, Mr. Ferguson recommends that it should be built directly at right angles with them, and project considerably beyond the line of the square of the offices; for, as he says very properly—"As the barn is the place from whence the greater part of the fodder and litter, &c., required for the various kinds of stock is taken, it is a matter of considerable importance that it should be placed in a convenient position to save labour, which, in too many instances, in new steadings, is, he fears, not so much attended to by architects as it ought to be."

The feeding sheds and stable are on the east or right of the plan, and the byres and sheds for young stock on the west or left. The whole can be fed, under cover, from passages leading from the straw barn. In the middle of the court are the piggeries, &c., and yard for horse-dung; and on the left of the byre is the yard for the cow-dung. Both Mr. Ferguson recommends should be covered over with a cheap roofing of felt, to exclude the heat of the sun and the washing of the dung by heavy rains. The drainage of all the houses is conveyed by vitrified socketed pipes into the end of the cow-dung yard, and then lifted from time to time and thrown over it, after which it is conveyed into the tank situated at the back, or on the north of the offices, about sixty feet from the water wheel of the thrashing mill, by which a power may be obtained to work a pump by a horizontal shaft, fixed to the back wall of the sheds, and this shaft is made also to drive chaff and turnip cutters and corn-bruisers, &c., by pulleys and belts.

The socketed pipes for the drainage of the various houses are flushed or scoured out from time to time by opening a spigot in a clean water tank situated at the end of the straw barn. This seems an admirable arrangement, for while it appears the urine of cattle requires constant dilution with water to make it in a fit state for the soil, it being admitted into the upper end of the pipes sweeps all before it into the tank, and the

houses in consequence are kept always in a sweet and tidy state. Before, however, the liquid manure of a farm steading should be applied to the soil, Mr. Ferguson recommends that it ought to be stored in tanks for about four weeks, that it may putrify or decompose, otherwise its causticity, being in a fresh state, would scorch or burn the crops. Four tanks, therefore, for such a farm as he represents (350 or 400 acres) should be provided. These, he says, if the steading is on the highest part of the farm, may be placed at any convenient spot, provided the drains leading to and from them have a proper and gradual descent; but if the farm is nearly level, or the fields to be irrigated are above the level of the steading, then, in the former case, the storage tanks should be set on dwarf walls in the neighbourhood, that sufficient pressure may be obtained; but in the latter case, they should be placed on an elevated part of the farm, and the liquid pumped into them by being conveyed in socketed or spigot-and-faucet glazed vitrified pipes, laid in drains under the surface. These pipes, the author says, answer the end admirably, and are only about half the price of iron pipes.

He recommends them to be laid over the farm in various places, leading from these storage tanks, and the fields to be irrigated by gravitation, by a hose pipe two inches in bore, fixed to a stop-cock, which ought to be at every 300 yards distance. The hose-pipe, he says, may be a canvas one, tarred to prevent its rotting; or a leather or gutta percha one may be used, but they are expensive. A man or lad can, with the hose, irrigate about an acre and a half each day, with the aid of tin pipes fixed, as occasion requires, to the end of the hose, to make it of any length.

About 1,200 gallons is stated to be sufficient for an acre of grass land, and it ought to be applied proportionally after each cutting.

The whole expense for the apparatus and laying pipes, &c., is stated to be £187 6s. 5d., or at the rate of £6 4s. 10d. to irrigate 30 acres; but where probably three times the number of stock represented in the report are kept, an expenditure of about £240 for tanks and pipes would enable a tenant to irrigate from 90 to 100 acres, and in that case the expense per acre would not exceed from 46s. to 48s.

Grass when irrigated in the manner pointed out in the report, may be cut four times in one season, if the soil is good and in sheltered situations; and if cattle are kept and fed mostly in the house, as recommended, in place of being allowed to pasture in the fields, an immense quantity of liquid manure will be available for the purposes of irrigation. This, about the most of farm steadings, is at present allowed to run to waste, which, to say the least of it, is unquestionably proved to be a most serious loss to farmers. We would therefore recommend the agricultural community at least to read and study Mr. Ferguson's Essay, as it gives a minute detail, and on the whole is well told. The plan for a farm steading seems to us exceedingly well arranged for convenience and economy in attending to stock, and we think worthy the attention of landed proprietors and farmers generally, who would do well to copy some of the practical directions given by Mr. Ferguson, particularly that of covering the dungyards to prevent the bad effects of the sun, or washing with heavy rains, which do great injury. —Glasgow Herald.

PEAT CHARCOAL.

SIR,—Having, on my return to London, looked over your number for July, I perceive an article alluding to "Peat Charcoal" and my humble self; and as you do me a wrong therein (I am satisfied unintentionally), I feel quite assured you will permit the insertion of this letter in explanation.

You say that in my pamphlet on the "Sanitary Reform" of London, &c., the merits of *peat charcoal*, not only as a deodorizer, but disinfectant, are strongly insisted upon. On reperusal you will see I do not use the word of "*disinfectant*" from beginning to end. I am perfectly aware how difficult is the question of "disinfection;" and when so many men of the first eminence hold that "*deodorization*" is not "*disinfection*," it would be very presumptuous in me to set it down as fact that they were wrong; hence I have always used the term *deodorization*. But, sir, as the subject is one of the deepest interest to all, allow me to give you my views and belief.

It is to be recollected that "*deodorization*," so called, by any other means than peat charcoal, is effected through the action of different compounds upon feculent matter, or by the liberation of certain gases, to act upon,

and, as it is hoped, neutralize or destroy the original noxiousness. Hence *two* odorous matters are placed in combination; and although the effluvium becomes changed, it is not destroyed or absorbed. The doubt then naturally comes, is such *deodorization* disinfection? I believe it is not. But what is the action of peat charcoal?

It is to be recollected that it is *perfectly pure and odourless*, possessing the power of absorbing above 80 per cent. of aqueous matter, and *at least* 90 volumes (I believe a good deal more) of those gases which are inimical to animal existence. It has also some peculiar power (independently of the well-known property of carbon) to draw to it, from the atmosphere, ammonia and sulphuretted hydrogen. Most greedily it absorbs those gases, treasuring and holding them up in the countless cells which the extreme porosity of its nature provides in every grain; and almost the moment contact takes place, odour ceases to be perceptible.

Still, the gas itself which yielded the odour *continues to exist*; although the compound is odourless, the gas is there undestroyed, yet, I believe, rendered powerless of evil to mankind.

The fact of the purity, &c., of peat charcoal will not be questioned: the latter statement, however, naturally will; but the test is within the reach of every one.

Charge peat charcoal with any given quantity of those gases, so that the compound be *odourless*. Place it then, or at any time after, on a red-hot plate; and as the grains become destroyed by fire, the gases will be restored to the atmosphere in their original state.

In this rests one of the great advantages of the compound as a manure, for no chemical action takes place to change the nature of those gases, which we all know are essential as the food of plants. In the compound they exist until, by the action of the soil and the atmosphere, gradual decomposition of the whole takes place, when carbonic acid gas is also yielded to the plant. Gradually and slowly this action proceeds; and as rain comes, the peat charcoal (which will usually last in the land for three, four, or five years) receives from it a renewed supply of ammonia and salts, thus unceasingly storing itself with increased fertilizing power.

Such being the actual properties of peat charcoal, may we not assume that it is a "*disinfectant*," if anything can be? Being perfectly pure itself, it seeks for and draws from the atmosphere around, all impurities. It becomes the recipient for that noxiousness which, no one will doubt, acts with evil upon us; and will not yield it again until it is itself destroyed.

If infection exist, where there is no perceptible odour, peat charcoal may not be a disinfectant. On the other hand, if we know that infection does exist, where noxious odours are present, and that the withdrawal of those odours from the atmosphere gives health, I may perhaps assume that so far, at least, *peat charcoal is a disinfectant as well as a deodorizer*.

Permit me to add that you have also mistaken my statement as to the destruction of the gases which accumulate in sewers, and from which so much evil arises. I state that "science at present knows no means for destroying those gases" in the vast bodies in which they are accumulating daily in the sewers. I quite agree with you that "the merest tyro in chemistry could name a dozen preparations by which they might be decomposed or absorbed;" but that is the particular gases themselves—not the millions and millions of square feet which from year's end to year's end undermine our streets and our dwellings, and into the latter of which every drain is a duct to draw that poison which, as yet, science has failed to destroy *en masse*, although she well knows how to kill it in detail.

I have the honour to be, sir,

Your faithful servant,

JASPER W. ROGERS.

—Athenæum.

CLOVER.

In "Morton's Cyclopædia of Agriculture," which is now in the course of publication, under the head of "Clover," we are told that the plant is a very great impoverisher of the land, and most peculiarly exhausting, owing to the large amount of alkalies, either potash or soda, and also of lime and magnesia, which it carries away from the soil. In the analysis of the inorganic constituents of clover, by Professor Way, the portion of lime equals 35 per cent., magnesia 11, potash 14, and soda only 1½. From these portions it is assumed that clover exhausts the land, makes it "clover sick," or refuses to grow the plant by reason of the want of these alkaline substances, and the farmer is compelled to suspend the cultivation of clover for a time, till a progressive disintegration of the soil liberates a quantity of these ingredients for the supply of future crops.

But Dr. Lyon Playfair, the writer of the article which promulgates these *pseudo* sturdy truths, has not yet, I very shrewdly suspect, ascertained the fact, if any substance passes *unaltered* into the organization of a plant, and composes its constituents; and if potash or soda, lime or magnesia, being applied to the land, will proceed to the existence of these bodies in the chemical formations. This *unknown* truth constitutes the foundation of the whole hypothesis. There is a very clear analogy between animals and vegetables, and we know that the same food produces bones, flesh, and excrements, of very different qualities in different animals; and we also know that crops of clover, in the quantity of

two tons on an acre, are grown on land in which the most minute analysis never discovered the smallest trace of potash or soda, lime or magnesia, but left the very reasonable supposition that the residual substances are engendered by the action of the living process, of which we may ever remain to be wholly ignorant, and that animals and vegetables are furnished by nature with the faculty of choosing and rejecting, and that their degree of instinct, in the shape of smell, dictates the use of any kind of food for the special purpose. Cattle are not fed with phosphate of lime to produce the bones of the body. The osseous structure proceeds from turnips and potatoes, which contain neither lime nor acid. So far for the first assertion.

In the second place, the learned chemist tells us that land becomes "clover-sick," or that it refuses to grow clover, from the want of potash and soda, lime, and magnesia, of which large quantities have been carried away by the preceding crops. But large crops of clover are successively grown without any appearance of sickness, where the land does not contain any alkaline substances, and where analysis would find them in the grown roots. Hence this position does not hold.

In the third place, the successive disintegrations of the soil is said to liberate the necessary substances for the growth of clover, and the land is renovated and rendered productive. But no setting free of substances can happen where no existence is found, and no cer-

tainty exists that disintegration and the liberation are strictly concomitant.

No plant thrives well when grown in too near succession by cultivation, and clover standing over winter is liable to be thrown out of the ground by the looseness of soils of a certain description, and acted upon by the alternations of the weather. After the cultivating process has been effected on any land, a fresh consolidation is necessary for the growth of any plant, which is partly effected by the roll, by the trampling done by the feet of sheep, and by the land remaining at rest for two or three years in grass. This latter provision, more than any other, prevents the clover-sickness, and disintegration may not go on in lands that are in a quiescent state. My own very extensive and varied practice never found any deficiency in clover by following these rules, and never sowed any soda or potash to supply the wants of the soil.

All plants must exhaust the soil in some degree, and some more than others; and all help to repair the loss by the decay of their bodies, which crumble into the elements of future nutrition and existence. All plants are, comparatively, improvers of the soil, which have

broad leaves and tap roots; the former shade the ground, retain moisture, and encourage an incipient decomposition; the roots penetrate the ground, divide the soil, and, by the decay of the fleshy root, afford the nutriment of future growth. Clover possesses both these qualities, and the introduction of it into British agriculture has always been allowed to form an era in the history of the art. The Norfolk farmers have prized clover as the precursor of the wheat-crop, and continue the just preference.

It is often said that it is better to say something than to say nothing; and chemistry will not yet be silent, notwithstanding the *hitherto* total failure of all its attempts to advance the practice of agriculture. This present case is another trifling motion in the limping progress of adventuring to cross the chasm that separates the practices of different arts, however nearly allied they may seem in the natural procreation. It will be well to seek the advancement of agriculture by the suggestions of its own rules and the observance of its own philosophy, which it enjoys in the specific form along with every other art that is practised by mankind. D.

GREAT SALE OF SHORT-HORNED CATTLE ON THE FARM OF MR. JAMES WATSON, OF WAULDBY.

A sale of more than one hundred head of short-horned cattle took place on Friday, Aug. 11, at Wauldby, Yorkshire, being one of the most important sales of live stock which have taken place in this district for some years. Mr. James Watson, the owner of the herd, has long been celebrated for the purity and excellence of his breed of short-horns. A finer or larger herd has rarely ever been exhibited than that which was brought into the ring on that day for sale. They were not remarkable for fat, Mr. Watson not having fed them up for sale, he not having, in fact, decided on declining the further occupancy of his farm until May last. They were, however, in a remarkably healthy condition, and exhibited abundant proofs of the care expended in their breeding.

Several hundred persons who are well known breeders and fanciers of short-horns attended.

An excellent luncheon was prepared by Mr. Watson for all present, and was served under the superintendence of Mr. Mountain, of the Hull Assembly Rooms. There was no lack of wines of the finest quality.

Mr. WETHERELL then said it would be very unnecessary for him to detain those present with any expression of his own opinion of the herd which he was now going to submit to them. Mr. Watson had, for now nearly fifty years, been a breeder of the first-class of short-horns, and had maintained the very highest character as a breeder. He had always been exceedingly careful for the purity of the blood. Sometimes they would find animals that had pedigrees as long as their arms were not of the slightest value in the world; but all who knew the breeding of Mr. Watson's short-horns

knew that their quality might be depended upon. Mr. Wetherell then referred to the bulls which Mr. Watson had used. He recommended all to secure the first blood for breeding, and then, with ordinary luck, they were sure to succeed. There was only one animal in the whole herd which Mr. Watson was not prepared to warrant as perfectly healthy and without any symptoms of disease. No tricks had been resorted to for the purpose of fattening them up, but they would be seen in the most natural possible state. He concluded by stating that Mr. Watson was willing to allow any of the cattle, when purchased, to stay on the farm for one week, with the same care, herdsman, and pasture they had hitherto had, and his servants would also assist in conveying the animals, when sold, to the Railway Station. In fact, if any person wished for anything in reason, no matter what, Mr. Watson would comply with it. He would detain them no longer, but proceed to put up the first lot.

The bidding then commenced, and proceeded very briskly; as may be imagined, when we state that the auctioneer "knocked off" more than one hundred head of cattle in about four hours. The gross amount of the sale was very near £2,500. The highest price fetched by one beast was £150. Many were sold at prices varying from £40 to £70. The following return shows the names of the purchasers, the number of lots, the date when calved, and the prices at which sold:—

PURCHASERS OF COWS AND HEIFERS.

Mr. Ambler, Watkinson Hall, Halifax.—1, c. 1837, £22 1s.; 20, c. 1844, £56 14s.; 39, c. 1846, £45 3s.; 47, c. 1847, £37 15s.

Mr. Jackson, Braffords.—2, c. 1839, £19 19s.

Mr. Keogh, Liverpool.—3, c. 1840, £26 5s.; 24, c. 1845, £34 13s.

Mr. Thompson, Anlaby.—4, c. 1840, £16 16s.; 8, c. 1841, £23 2s.; 9, c. 1841, £16 16s.; 14, c. 1843, £28 7s.; 15, c. 1843, £22 1s.; 18, c. 1844, £16 16s.; 21, c. 1844, £23 2s.; 26, c. 1845, £19 19s.; 30, c. 1845, £25 4s.; 33, c. 1845, £21 4s.; 34, c. 1847, £30 19s.; 52, c. 1847, £16 16s.; 54, c. 1847, £35 14s.; 59, c. 1848, £28 7s.; 73, c. 1849, £21 4s.; 74, c. 1849, £22 1s.; 75, c. 1849, £22 1s.; 81, c. 1849, £18 18s.; 86, c. 1850, £14 14s.; 88, c. 1850, £7 7s.; 91, c. 1850, £10 10s.

Mr. Butters, Thorngumbald.—5, c. 1840, £13 13s.

Mr. Dickinson, Bracken.—6, c. 1841, £26 5s.; and calf, £5 5s.

Mr. James Singleton, Pocklington.—7, c. 1841, £14 14s.; 32, c. 1845, £16 16s.; 40, c. 1846, £22 1s.; 41, c. 1846, £24 3s.

Mr. Turner, agent for Mr. Marshall, M.P., on the Patrington estate.—11, c. 1842, £25 4s.; 17, c. 1844, £27 6s.

Mr. Leonard, Hull.—10, c. 1841, £22 1s.; 13, c. 1843, £22 1s.

Mr. Yorke, of Trapston.—12, c. 1842, £16 16s.; 50, c. 1847, £31 10s.

Mr. Christopher Ringrose, Tronby.—16, c. 1843, £21.

Mr. Wetherell (the auctioneer).—19, c. 1844, £22 1s.; 29, c. 1845, £29 8s.; 42, c. 1846, £22 1s.; 57, c. 1848, £43 1s.

Mr. John Byron, Killingholme.—22, c. 1845, £37 16s.; 28, c. 1845, £22 1s.; 70, c. 1849, £21 7s.; 77, c. 1849, £15 15s.; 92, c. 1850, £9 9s.

Mr. William Smith, West Rasen, Lincolnshire.—23, c. 1845, £47 5s.; 65, c. 1848, £27 6s.

Mr. Torr, Alesby Manor, near Grimsby.—25 (bred by Mr. Waddie), £21; 78, c. 1849, £19 19s.

Mr. William Watson, Westella Grange.—27, c. 1845, £14 14s.

Mr. Jefferson.—31, c. 1845, £69 6s.; and calf, £13 13s.; 37, c. 1856, £57 15s.; 82, c. 1849, £33 12s.

Mr. Jordan.—51, c. 1847, £21; 83, c. 1849, £16 16s.

Mr. Richmond.—34, c. 1845, £23.

Mr. Rennison.—35, c. 1845, £21.

Mr. Hooper, Driffeld Greets.—36, c. 1845, £22 1s.; 19, c. 1849, £16 16s.

Mr. Wells, Booth Ferry.—38, c. 1846, £36 15s.; 44, c. 1847, £24 3s.; 53, c. 1847, £24 3s.

Mr. Carllil, Hessele.—55, c. 1847, £27 6s.; 71, c. 1849, £15 15s.; 76, c. 1849, £17 17s.

Mr. Henry Watson, Londonthorpe, near Grantham.—45, c. 1847, £24 3s.; 43, c. 1847, £36 15s.; 56, c. 1847, £32 11s.; 68, c. 1849, £45 3s.

Mr. Lambert.—58, c. 1848, £36 15s.; 80, c. 1849, £15 15s.

Mr. W. Wright, Siggleshorpe.—60, c. 1848, £26 5s.; 62, c. 1848, £31 10s.; 66, c. 1848, £33 12s.; 69, c. 1849, £23 2s.

Mr. Burkill, Winttingham.—45, c. 1847, £21.

Mr. Fisher, Leckonfield.—61, c. 1848, £42.

Mr. Robinson, 63, c. 1848, £27 6s.

Mr. Stickney, Bilton.—64, c. 1848, £24 3s.

Mr. McCluntock, from Ireland.—67, c. 1849, £49 7s.

Mr. Owst, Keyingham.—72, c. 1849, £16 16s.; 89, c. 1850, £8 8s.

Mr. Booth.—84, c. 1850, £18 18s.; 85, c. 1850, £21; 87, c. 1850, £10 10s.

PURCHASERS OF BULLS AND BULL CALVES.

Mr. Wells.—93, c. 1846, £25 4s.

Mr. Leonard.—94, c. 1846, £23 2s.

Mr. Lambert.—96, c. 1849, £22 1s.

Mr. Barker.—97, c. 1848, £24 3s.

Mr. Keogh.—98, c. 1848, £150.

Mr. Watson.—99, c. 1848, £21.

Mr. Byron.—100, c. 1849, £26 5s.

Mr. Wood.—101, c. 1849, £52 10s.

Mr. Wetherell.—102, c. 1850, £15 15s.

Mr. C. Ringrose.—103, c. 1850, £21.

Mr. Smith.—104, c. 1850, £18 18s.

Mr. Monday.—105, c. 1850, £15 15s.

Mr. Thompson.—106, c. 1850, £12 12s.

—Abridged from the *Hull Packet*.

CALENDAR OF HORTICULTURE.—SEPTEMBER.

The potato disease (so far, at least, as the haulm is partially affected,) having manifested itself in this locality since the thunder storm of July 18th, I note the circumstance on this 16th of August, to enable readers in near and remote situations to compare appearances and the results at the commencement of September, intending, at the close of this calendar, to offer some further remarks on this and other subjects apposite to our usual monthly Retrospect. The weather, as the meteorological diary will evince, has been of an unsettled character since the middle of July. Rains and gloom have been more frequent than would be deemed favourable to the harvest, but the former in far less volume than the gardens of East Surrey required, for they have failed to penetrate, even light and free-working soils, to the depth of six inches. Every vegetable crop remains good, considering the paucity of ground moisture; and, upon inquiry, it appears that very few tubers of the potato—and in many plots scarcely any, if any, of the haulm—are at all tainted.

VEGETABLE DEPARTMENT.

First week.—If the *winter* and *Flanders spinach*

be not already completely sown, finish the work forthwith; the plants raised from the earliest sowing of August will, if the autumn prove propitious, yield several nice pickings of fine leaves, till the first frost stop their advance. Be sure to thin-out the plants to stand three inches asunder. The present sowing will be productive in the spring. Sow now *turnips*, *Welsh onions*, *endive*, *radishes* of all varieties, particularly the large black Spanish, for winter, *small salading*, on a warm border or under a hand-glass, every 10 or 12 days, and *corn salad*. Sow *lettuce* on a warm border; some plants to stand the winter, others to be transplanted into frames. The hardier *cos* and *brown Dutch* are best.

Plant out all the winter greens. Prepare the beds according to the requirements of the family, say each 3 to 4 feet wide; let good fresh loam be preferred; dig the ground neatly and evenly; choose an open situation, that is, as respects the absence of trees and shrubs, but sheltered from the north and east. If for final standing, plant each variety according to the size the plant in general attains; thus *broccoli* will require two feet wide

spaces—but it is late for the removal of that vegetable. Here let the reader call to mind the plants already in trenches, and at the end of September, or so soon as rimy frost threaten, let each be made to slope toward north and north east, while this position is secured by placing mould over the stems, taken from the south ridge of the trench. *Brussels sprouts* require 18 inches to 2 feet spaces; *broccoli*, including *Scotch kale*, much the same; *dwarf green savoys*, from 12 to 18 inches; the larger yellow variety, 18 inches by 2 feet. These removals to their final situations ought not to be delayed.

Celery.—Plant for the last time in trenches. In earthing-up the earlier plantings, it has been customary to recommend a frequent repetition, but modern practice has rejected the system. It is certain that much trouble and care are required to keep the hearts of celery free from earth, which is apt to fall into them at every operation. Now, if earthing be not attempted till the plants have attained their full stature, no accidents of consequence can occur. Therefore, the modern practice is to be preferred; and as the blanching or etiolation of the leaf-stalks (which, with it, comprises tenderness,) is the sole object of earthing-up, it will be fully attained at once, provided the soil be in a friable condition, and so applied as to cover and closely compress each entire full-grown plant to the height of its leaf-stems.

Michaelmas cauliflowers.—Some of the most forward may show their heads, if the weather prove warm and dry; form a sort of basin, a foot wide, around each stem, and pour in soft pond-water, with, now and then, a pinch of real guano, dissolved in a quart. Guano assuredly aids plants of the Brassica family, and fine flower-heads may be obtained in October.

Tie up endive to blanch it, and also, as the season advances, cover other of the larger plants with sea-kale pots, which will preserve from wet as well as blanch. Plant out more endive in a warm and dry spot of ground.

Turnips.—Hoe those last sown. Destroy all weeds among crops, and remember that the present is the month in which weeds revel, and, if neglected, establish themselves in secure winter quarters, from which the gardener cannot, without great difficulty, dislodge them in the spring.

Gather seeds, if it be thought desirable to do so; in general, however, the trouble is seldom repaid; it will be more wise to convert the debris of the garden either into compost manure, or to char it by slow combustion. Prepare to bring the kitchen garden into that clean sober condition of repose which is so delightful to the eye of taste during autumn and winter.

FRUIT DEPARTMENT.

Vines, on the walls, appear to have a better promise of a good crop this year than of late; the clusters are very abundant in number and in berries. Sun is of consequence, and must be admitted by pruning back all the fruit-shoots to the joint above the bunch, and by the removal of every useless shoot, but reserving the main leaves. *Peaches* and *nectarines* now become mature; encourage them by nailing-in the well-placed and succession bearers, and removing the wild and surplus wood. A great deal of judgment is at all times required to keep a tree "green throughout," by full, regular, and yet open training; and the question of "summer pruning" must be determined by studying the habits of the trees in connexion with local site and soil, even from the first spring dis-budding to the present period.

Strawberries.—Regulate the old, and form new plantations. Deep tillage, sound and rather firm loam worked 18 inches to 2 feet deep, constitute the foundation; manure is of little importance, if the rows be well mulched in April. Plant wall-rooted runners, of favourite sorts, in long rows 2 feet asunder, or in three-row beds, 2 feet asunder, and 9 to 12 inches apart in the rows. Spread the roots carefully, firm them with fine covering soil, and choose a rather moist soil and weather. Fresh loam should be given to such fruitful plants as are retained, but the work may be deferred till late in the autumn.

FRUITS UNDER GLASS.

All the grapes being ripe, the object remains to preserve the fruit during autumn, and, to some extent, till after Christmas. This can only be effected by a dry atmosphere, and the free admission of cool dry air, damp being the cause of that decay and mouldiness which too frequently destroy great quantities of the best fruit, especially that of the thin-skinned and luscious West's St. Peter's. Strong and active fires in the early morning, with free ventilation, most effectually dry the floor and walls of a vinery, the current of dry external air carrying off the vapour thus raised. By watchfulness, the removal at once of any cracked or mouldy berry, of every decaying or fallen leaf, and the judicious adoption of the measures above recommended, a fine crop may be kept for months in high perfection.

Pine-apples grow more, it is believed, in a genial September than in any other month of the year. Therefore, whether the plants be from the first raised and grown in pots, or put out in open beds, the utmost care to supply air, water, and sun should be taken always, but, as respects water, only as required. Over-watering is the worst of mistakes;

we suspect that a gentle afternoon "dewing" before closing, with a vaporous atmosphere, must be one of the most health-preserving of appliances. The pine-apple is, at this season, generally raised from strong suckers, taken from fruited plants, and a small pot of light or simple peat-earth is the best medium; let such be plunged in a bottom-heat of 75 to 80 degrees, without watering, till the plant fill its pot with roots, and be kept in a closed propagation pit. Suckers retained on the old stems had better be plunged without pots, balls entire, in the bed of a proper pine-pit, heated atmospherically, and at bottom by means of water pipes. As these are operations of affluence, nothing should be lacking in skill or its machinal adjuncts.

ORNAMENTAL DEPARTMENTS.

Plant tulips, hyacinths, narcissi, crocuses, dog's-tooth violets, and, indeed, all other bulbs, also anemones and ranunculuses. Take off carnation layers, and set a few of the best-rooted in borders or parterre, but plant the greater number in small beds of well-prepared ground (remembering that chalk and fine road-sand are beneficial), and some in pots; thus the plants can be protected by mats or in cold frames during severe weather. Treat pinks raised from pipings in the same way; pot off

some for forcing. Propagate, by slips or cuttings, the common and *Portugal laurel*, and, by layers, the *bay*, *laurustinus*, *Japan euonymus*, &c. This is a favourable month for planting *box-edging* and *evergreens* of every kind.

Clip hedges, trim the box, mow grass lawns, roll gravel, and perform all operations of neatness and order.

CLOSING REMARKS.

The weather, though uncertain and occasionally showery, remained dry on the whole till the day on which this calendar closes. The rain then was profuse, and for the first time soaked the ground. This rain will decide the character of the potato later crop. The haulm has been partially attacked, but the dealers tell us that the tubers are perfect. Some haulm turns off with that yellow tinge which indicates ripening, in other instances it has become perfectly black. Vegetables are fine. Our market gardens evince the enormous increase of the *rhubarb plant*, it is seen by acres. *Runner-beans* appear everywhere in dwarfed rows. The droughty condition of the land has prematurely caused the fall of leaves from many trees.

Croydon, 21st August.

J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR AUGUST.

Notwithstanding that harvest-work has been frequently interrupted by the changeable state of the weather, a fair average quantity of winter-wheat, including barley, oats, and peas, has been secured in the eastern, western, southern, and northern counties; but the frequent rains have materially retarded the ripening progress of the spring wheats in the midland districts and some other parts of England; hence, a large portion of them still remains in the fields up to this time. From present appearances we are inclined to the opinion, that the whole of the crops will not be secured at the usual average period, by at least ten days or a fortnight. Respecting the yield of the new wheats, opinions are much at variance with each other; but, from the most careful inquiries on this head, we are inclined to believe that it will be found decidedly less than that produced in 1849—which, it will be recollected, was a heavy crop, and barely equal to that of 1848. The few samples which have, as yet, appeared at Mark-Lane and elsewhere, have come to hand in much better condition than had been expected: nevertheless, the general quality can scarcely be termed a good one. The continuance

of fine dry weather between this and the middle of September may enable the midland growers to get their corn into stack in a dryer state than those in the south; but the damp atmosphere experienced during the greater portion of August has, undoubtedly, reduced the value of the corn from 2s. to 3s. per qr. Although the quantity of last year's wheat on hand is represented as somewhat extensive, notwithstanding the large additional sales (estimated at nearly one million quarters) which have been made since January, threshing of new parcels has been steadily progressing—a proof, if that were wanted, of the existence of much distress amongst the small holders of land. Our reports mostly agree in stating that the crop of barley is likely to prove large, that of oats good, and that of beans and peas moderate; yet we conceive that a scarcity of really fine malting samples of the former article will be discovered as the season advances.

From nearly all quarters our accounts respecting the safety of the potato crop are less conflicting than might have been anticipated. That the disease has extended itself since we last wrote is too evident; but we doubt much whether the actual losses will eventually be found so extensive as some parties have imagined. The breadth of land under

potato culture this year, especially in Ireland, exceeds former periods; and the supplies brought to London during the month have exhibited but few, if any, signs of decay. That potatoes require a warm and dry temperature to ripen is evident to all. That they have not received for some weeks past, and the total supply for winter use will undoubtedly depend, in a great measure, upon the nature of the weather in September. Prices of all kinds of potatoes continue ruinously low, those of the best ware qualities in the Borough and Spitalfields markets having been only from 45s. to 75s. per ton. It is asserted that many of the growers in Essex and Kent are forcing their crop for sale at almost any sacrifice, rather than run the risk of the loss of the entire produce by disease. If such be really the case, we consider that they are acting unwisely. It may appear somewhat premature for us to write with anything like confidence as regards future prices; but when we consider the favourable statements from most parts of the continent of Europe, as well as from the United States, bearing upon the yield and quality of the crops, they being almost uniformly good, we are led to the conclusion that there is very little prospect of any permanent rise in the quotations, calculated to benefit the home producers. France has evidently large resources of "bread-stuffs;" and the near proximity of that country to Mark-Lane, and the rapidity of the communication, render speculation in our markets extremely hazardous. At New York, flour may now be purchased on more reasonable terms; and we should not be surprised to find large supplies coming to hand at Liverpool, towards the close of the navigation, particularly as the Americans are now consuming unusually large quantities of British manufactured goods.

The crop of grasses as well as seeds is turning out tolerably productive. A few parcels of new rape-seed have changed hands at £23 to £25 per last, and linseed cakes have ruled very dull at £8 to £9 per 1,000.

The public sales of colonial wool were commenced in London on the 22nd. They are expected to last a month, and not less than 50,000 bales will be brought forward, and no doubt disposed of, as the stocks in the manufacturing districts are reduced to a very narrow compass. The whole of the parcels as yet offered have sold at very full prices.

Three pockets of new hops have reached the Borough, from Kent, in a very unripe state. They have sold at £8 8s. per cwt. The mould has made its appearance in most of the plantations, yet the duty has been done at £200,000—being £120,000 to £125,000 more than last year at this time.

In Ireland and Scotland, rather large breadths of land have been cleared of thin wheat and oats, sam-

ples of which, in good condition, have been already disposed of.

The general provision, including the hay and straw markets, have been far from active. In prices, however, we have no material change to report.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since we last wrote, the supplies of live stock exhibited in Smithfield market have been unusually large, compared with those brought forward at most previous corresponding periods of the year; but their general quality has proved by no means first-rate. The principal increase in the receipts, as will be seen below, has been in those from abroad, which have been equal to those of 1847, in which year, it will be recollected, both beef and mutton were selling at unusually high prices, or nearly 25 per cent. higher than at present. The "season" from the northern districts has now fairly set in. From those quarters, not less than 9,200 beasts have reached us greatly out of condition; indeed at least a moiety of them have been wholly unfit for first-rate butchers. It must be observed, however, that this is one of the offsprings of free-trade. Oil-cake has been for some time past selling at extremely low prices; nevertheless very few of our graziers, from the low value of their produce, have been in a position to purchase their usual quantities. It is true that pasturage has continued extremely abundant, and dry food has ruled very low in price; yet, from the circumstance just referred to, the production of fat beasts has evidently fallen off, as the "forcing" system has, from necessity, been abandoned to some extent. Thus, we have had heavy supplies as to number; but we doubt much whether the actual quantity of food has exceeded former seasons. The changeable state of the weather having rendered it impossible to transmit meat in a wholesome state from the provinces to Newgate and Leadenhall, a fair average amount of business has been transacted in Smithfield, and the quotations of the best kinds of stock have had an upward tendency. From abroad, the following importations have taken place into London:—

	Head.
Beasts	4,277
Sheep	17,376
Lambs	2,370
Calves	1,945
Pigs	581

IMPORTS AT CORRESPONDING PERIODS.

	Aug. 1847.	Aug. 1848.	Aug. 1849.
Beasts	4,185 ..	2,526 ..	2,913
Sheep	18,489 ..	14,266 ..	15,981
Lambs	874 ..	871 ..	1,179
Calves	1,942 ..	2,135 ..	1,000
Pigs	— ..	— ..	302

Foreign supplies appear (arising from Smithfield being the principal ready-money market in the kingdom, and the present low freights from Holland—the result of increased competition amongst the steam-boat companies—to be almost wholly directed towards the metropolis, as the receipts at the outports have been confined to less than 1,600 head of all kinds of stock.

The total supplies of English and foreign stock shown in Smithfield have been as under:—

	Head.
Beasts.....	19,390
Cows	475
Sheep and lambs	181,490
Calves.....	2,348
Pigs.....	2,291

STOCK SHOWN AT CORRESPONDING PERIODS.

	Aug. 1847.	Aug. 1848.	Aug. 1849.
Beasts.....	19,073 ..	17,975 ..	18,133
Cows	878 ..	497 ..	454
Sheep and lambs ..	225,390 ..	153,280 ..	173,620
Calves.....	3,860 ..	3,840 ..	2,480
Pigs.....	2,227 ..	2,443 ..	2,200

The home-bullock supplies have been thus derived:—

Northern districts	9,200
Eastern, Western, do.	1,600
Other parts of England	1,600
Scotland	1,200

About 600 of the beasts from Scotland reached us by railway conveyance. The Irish supplies, direct by sea, have comprised 5 oxen, 91 cows, 83 lambs, 20 sheep, and 14 calves.

The average prices for the month have ruled thus:—

Per 8 lbs., to sink the offal.

	s.	d.	s.	d.
Beef, from	2	6	to	3 10
Mutton....	3	2	to	4 2
Lamb	3	6	to	4 6
Veal	3	0	to	4 0
Pork	3	2	to	4 0

COMPARISON OF PRICES.

	Aug. 1847.	Aug. 1848.	Aug. 1849.
s. d. s. d. s. d. s. d. s. d. s. d.			
Beef, from 3	4 to 5	6. 2 to 10	4 4. 2 to 8
Mutton. . .	3 8 to 5 4	3 10 to 5 0	2 10 to 4 0
Lamb . . .	4 10 to 6 2	4 0 to 5 2	4 0 to 5 0
Veal . . .	4 0 to 5 0	3 6 to 4 2	3 0 to 3 6
Pork . . .	4 0 to 4 10	3 8 to 4 6	3 2 to 4 0

Very limited supplies of meat have appeared in Newgate and Leadenhall. On the whole, the demand has been far more active, at but little alteration in prices. Beef, from 2s. 4d. to 3s. 6d.; mutton, 2s. 10d. to 4s.; lamb, 3s. 6d. to 4s. 4d.; veal, 3s. to 3s. 10d.; and pork, 2s. 10d. to 3s. 10d. per 8 lbs., by the carcass.

Very few losses appear to have been sustained by disease for some time past. From Holland we learn that the quantity of stock ready for shipment to this country is decidedly on the increase.

NORTH NORTHUMBERLAND.

In our last report (July 9) we notified a severe visitation by the windy element, but up to that day its effect on the grain crops could not be minutely calculated; on early situations the wheat plant being in bloom, and on later localities only bursting into ear. For several days thereafter appearances indicated damage to a considerable extent on all exposed situations—the colour of rich green was changed to a brown, but the fine forcing weather that has since intervened causes us to hope for the best, although very much of the wheat crop is more or less blighted, and a really perfect ear can rarely be met with; yet with such weather as we are favoured with for the last few days, until reaping and stacking be finished, we anticipate a full-weight sample of wheat, although the yield cannot be taken as an average. Oats are generally thin, and will yield below usual average quantity; quality seems so far fine. Barley on all well-cultivated soils will reap the best of our cereals this season, and present appearances are in favour of fine quality. Hay proved a very light crop on all except old meadows, and has commanded rather higher prices in the market than for some years past. Turnips, of which a very large breadth has been sown, are of very varied quality; an extra fine crop is rarely to be met with. We hear of some of the early sorts already run to seed; and we have seen many fine fields only half-covered with plants. On the eastern part of the county, from Morpeth north to the Tweed, defects are very visible. We have also seen the crops over part of Berwickshire, East Lothian, Selkirk, and Roxburghshire; and appearances, so far as we can judge at present, are decidedly in favour of the latter county. We believe that the east-coast farmer, from Edinburgh south to the vale of the Ayr in Northumberland, never suffered more from dry, parching weather since 1826; and, taking the entire range of this county, the crops will not be bulky—with considerable defect in the wheat on all exposed situations. Potatoes are reported from nearly all quarters as affected by disease; and we latterly had ocular proof of its dire effect on a plot we inspected, yet from the locality from whence we write the blight on the potato is only partial. Fat and store cattle and sheep continue to sell at very low prices; wool, on the reverse, has been very generally bought up by the merchants, at prices a shade higher than last year: the latter, indeed, is the only article which has this season paid the agriculturist for production. We hope “the better times” are now not far distant! At least, if we look at the splendid display at our agricultural society's meeting at Alnwick on the 6th, it might augur a fair indication that some life is left in the Northumbrian farmer; presided over as it was by the noble patron, and countenanced by all the principal nobles and gentry in the county. We also lately witnessed another feature of rising prosperity, having been favoured with inspection of a farm lately purchased by a wealthy merchant, whose management will not stand second to any more noisy pretender in the higher latitudes of southern England. We sincerely hope the gentleman will yet be amply rewarded; and humbly record our testimony and gratification at witnessing an outlay on a grateful soil, with a taste and economy which does him great credit.—
Aug. 16.

DURHAM.

The weather during the past month, and up to this date, has been exceedingly changeable: the wheat that appeared so promising in the spring months has sustained considerable injury from the heavy rains and violent winds. The crops are much twisted and laid. The dreadful gale on the 3rd of July, and also on the

19th inst., has been productive of most serious damage to crops in general; large breadths of turnips were entirely swept away, and had to be resown, from the effects of the former visitation; and on Monday last the standing crops were beaten out, and suffered severely by the high wind. Some farmers state that in exposed situations they have lost twelve bushels of wheat per acre, such has been the effects of the weather on our occupation. The manufacture of corn is widely different to that of calico: it is difficult to offer an opinion respecting the yield of this crop; it will be much inferior to last year, and also the quality. The harvest has partially commenced in this neighbourhood, and next week it will be general. The weather is showery and unsettled, and genial heat is much wanted to ripen the grain; but let us humbly hope that it may be so kindly ordained that we may be blest with fine weather for the harvest. We trust there are few who can contemplate on the present appearance without the greatest anxiety. There are some instances where the mildew on white wheat is complained of, but we do not think the injury is to any great extent. It is gratifying in having to observe that we have seldom witnessed a more promising indication of an abundant crop of oats and barley; the frequent rains have proved highly beneficial to them, and they have not suffered like wheat from the storms. Beans and peas have sustained no injury from the weather, and

are quite free from lice and insect, and promise average crops. Tares have been an abundant crop this season. With respect to the potato crop they have been promising, but it is much to be regretted that the disease is again apparent: it has not yet shown itself so extensively as it did last year; the quality is particularly fine where they are not affected by disease. The turnips are remarkably promising; we have scarcely witnessed a failure, except on light sandy soils, where they were cut off by the destructive wind. The swedes assume a most healthy and vigorous appearance. The hay has not cut off so heavy as we were at one time of the season led to expect: there are many instances where it is much injured by the humidity of the season and the late period of the year to which it has been protracted; in the late districts a great quantity is not yet secured. Pastures have afforded abundance of keep, and aftermath is very good, which has been productive of an upward tendency in our lean stock markets. There has been also more animation in our lamb markets. Wool is the only article which has been selling at remunerative prices to the farmer. Agricultural operations are in a state of forwardness, and summer fallows are in a good state. Labourers are plentiful, and a great many hands have been out of employment during the summer. The epidemic amongst cattle has a good deal abated.—August 21.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

APPLEBY FAIR (Wednesday last).—There appeared a slight decrease in the quantity of cheese over late years, there being not more than sixty-four carts in the market, for which sales were rather dull, particularly towards the close of the market. New milk cheese sold from 5d. to 5½d. per lb., and old milk do. average 2½d. per lb. In the sheep and lamb market there appeared to be more than the usual quantity exposed for sale. Black-faced three-year-old wethers sold from 14s. to 18s. each, and were principally very lean stock; breeding white-faced ewes from 25s. to 30s.; bred lambs from 19s. to 24s.; half-bred do. from 9s. to 12s.; smaller half-bred lambs would average 7s. 6d. Calving cows were in good request, and sold readily at an advanced price. Cows in good condition for feeding also sold well, and met with customers quickly. People who brought sheep to the fair did not get what they expected, although it was considered a selling market, at a price.

BEDFORD FAIR, August 21.—There was an extensive supply of people for grazing at this fair, which were sold freely; former prices were well supported, and in some cases an advance of 10s. per head was obtained above the prices offered at Buckingham fair. The beasts in general were good in quality, and nearly all sold; Yorkshire cows, with calves by their side, £15 to £18 per head; in calf, £12 to £16. Heifers, two years old, forward with calf, £9 to £11 per head. The supply of sheep was small, and of inferior quality, consequently little business was done.

CARLISLE FAT CATTLE MARKET, August 22.—Our market this morning was largely supplied with beasts. A few of prime quality. Business somewhat brisk, the best animals finding ready purchasers at fully late rates. A very large show of sheep—indeed, there has not been more offering for many weeks. The quality of a great portion very inferior. Buyers were not numerous, and business was but slowly effected, being principally with butchers, who bought up the best descriptions for immediate slaughtering. A large number remained unsold at the close. The show of lambs was again limited, and those offered found early purchasers. Calves were readily disposed of, being in prime condition. Prices: Beasts, 4s. 9d. to 5s. 6d.; sheep and lambs, 4½d. to 5d.; calves, 4½d. to 5d. per lb., sinking offal.

FALKIRK TRYST.—The show of cattle was excellent, it being generally remarked that better beasts have never been brought forward at this season of the year. The animals most

in request were those in good condition, which were readily picked up on Monday afternoon. The best lot of fat was sold by Mr. Mather, of Glasgow, for £16 each, which was the top price of the market. Some North Highlanders, for feeding, were also quickly bought up, and very few left unsold at the close of yesterday's market. The demand for middling qualities was not great, and many lots, of Irish cattle more particularly, were turned away without purchasers. Angus-shires were a poor show, generally speaking, with the exception of a splendid lot of eighty animals, mixed with Aberdeenshire three-year-olds, which were sold by Mr. Fauns, Brechin, to Mr. Kennedy, near Maybole, Ayrshire, at £12 12s. each, the highest price obtained for this description of stock. Inferior animals of the same breed brought less money, varying from £6 to £8, but there were few, comparatively, brought forward, and those that made their appearance were rather difficult to sell. Of West Highlanders, those that were on the ground found very ready purchasers at prices a shade under what could have been obtained at last tryst. A very fine lot of three-year-olds were sold by Mr. Gordon, from Aberdeenshire, to a Linlithgow gentleman, at £9 each; and another lot, somewhat inferior, sold to the same party for £8 each. Two-year-old West Highlanders fetched, on an average, £5 each. No lots at the close of the market remained unsold. North Highlanders made their appearance in large numbers, and from this cause, perhaps, the demand was not so brisk, though a good clearance was effected in the course of Tuesday and Wednesday, at prices averaging, for three-year-olds £4 5s. to £5, two-year-olds from £2 5s. to £2 15s., and year-old stirks were bought up readily from 15s. to £1. A few North Highland cows found purchasers at £2 10s. each. The show of Irish beasts was uncommonly large, and formed nearly a third part of the whole cattle on the ground. There was but an indifferent demand, and, though many good lots changed hands, last night found a large number standing unsold. The market for Irish cattle may be considered a very dull one, and prices from 10 to 15 per cent. below those of last year. The show of milk cows was rather limited, and what was of them of inferior quality. Prices ranged much the same as last market, from £7 to £10, a few superior beasts bringing something more. There was not much demand, and the supply was equal to it. The show of horses of all kinds was rather meagre on Wednesday, the best animals having been picked up on Tuesday, but on neither

day was the market a good one. There were few purchasers, and sales difficult to effect. Saddle horses were a very poor show in point of numbers, though a few excellent animals which were on the ground sold from £25 to £35 each. The best animal sold yesterday was a carriage horse, disposed of by Mr. Mackinlay, of Glasgow, for £46. Cart-horses were also an indifferent show for the most part, and what was good found purchasers, though, generally speaking, there was very little demand. Irish ponies, of which a few were brought forward, were selling at from £6 to £10.—*Agr. Advertiser.*

HORNCASTLE GREAT HORSE FAIR.—This, the most extensive horse fair in England, which is held for fourteen days, commencing August 10, terminated yesterday. At no former period were so many fine animals exhibited for sale. Carriage-horses, hunters, galloways, and cart-horses of the most splendid description continued to arrive every day during the fair from Scotland, Ireland, and many other parts; but none exceeded in point of symmetry the animals sent from Yorkshire, Lincolnshire, Leicestershire, Norfolk and Suffolk. The attendance of buyers from all the great towns in England was unusually great, and many of the most eminent dealers from the continent were also present. Business was carried on with great spirit during the fourteen days at the following quotations:—The young carriage-horses, fifteen and sixteen hand high and well matched, sold freely at 250 to 300 guineas the pair, and some very superior reached 320 guineas; hunters fetched 100 to 150 guineas each; galloways, 60 up to 80 guineas; strong cobs, 40 to 50 guineas; small ponies were also in great demand, making 15 to 18 guineas each. The show of cart-horses was good, the best five-year-olds, suitable for London work, making from 60 to 70 guineas each; second-rate quality, 30 to 40 guineas; colts, two and three years old, 35 to 40 guineas; yearlings, 12 to 16 guineas. Great credit is due to the breeders generally for the great improvement made in the breed of horses of all descriptions. The Great Northern Railway took a great number of the most valuable animals to London, being consigned to Messrs. Wimbush, Collius, Burford, and other eminent dealers.

KNIGHTON FAIR (Monday) was well attended with stock of all descriptions, the supply being the largest we remember at this season. The town was quite full, and fat stock soon found purchasers. Fat cows sold at 5d. to 5½d. per lb.; fat sheep at fully 5½d. per lb.; and all in the fair of each description were sold. Steers were quite a drag. Strong steer pigs were in great demand. The horse fair was full, but most of the animals were of a very humble order. The greater part of them went away unsold.

IPSWICH LAMB FAIR.—The supply of lambs and sheep exceeded 35,000, being one-eighth short the average of past years. We have seen the Lambs in decidedly better condition, but never better in breed and symmetry. Amongst the Downes were those of Sir W. Middleton, Baronet; Sir Thomas Cullum; Messrs. Smith, Everett, Garnham, Newton, Payne, and Walton; and the half-Down and Norfolks of Messrs. Catlin, Cobbold, Barrett, Fisk, Roberts, and Walker; all of which, with three exceptions, readily found purchasers the first day at prices about 1s per head below last year. Messrs. Betts, Munnings, Nunn, Page, Ruffell, Turner, and other dealers, exhibited some very superior black-faced shearing ewes and lambs, in variety, the former of which were much in request at prices from 30s. to 38s. each. An extra lot, belonging to Mr. Betts, realized 40s. per head. The salesmen and dealers from Smithfield and Romford were free purchasers of fat sheep at fully 6d. per stone advance. Mr. Sexton, as usual, exhibited an excellent stand of Sussex Down tips with good success, at high rates; and 29 superior Hampshire tup lambs from Mr. Parson's, of Assington, were all purchased by Mr. Betts at £4 10s. each. We scarcely remember so few store beasts on offer, Messrs. Betts and Benson being the principal exhibitors, who were alike fortunate in selling out the first day at from 2s. 9d. to 3s. per stone, estimated weight when fat. The fat beasts on offer were disposed of at fully 6s. per stone. In the horse department some very promising colts and Welsh ponies were exhibited, and the greater part found purchasers the first day. Messrs. Garrett and Sons' exhibition of prize implements, in drills and other machines, deservedly commanded attention.—Fair Field, Second Day, Two o'clock P.M.: With a greatly reduced supply and attendance, some considerable business has transpired, principally amongst the dealers, at prices about equal to yesterday; so that, altogether, this must

be considered a good selling fair. The following will be found the prices realized by growers:—

	DOWN LAMBS.		Wethers.		Ewes.	
	s.	d.	s.	d.	s.	d.
Sir T. G. Cullum, Bart.	20	0				
Mr. Everett, Brightwell Hall.	20	6			18	6
Mr. Garnham, Rougham.	21	0				
Mr. Newton, Eldon.	20	6				
Mr. Barthropp, Crettingham.	21	6				
Mr. Payne, Eldon.	19	9				
Mr. Smith, Bartonmere.	22	6				
Mr. Walton, Newbourn.	21	0			16	6

HALF-BRED DOWNS AND NORFOLKS.

Mr. Roberts, Alderton.	18	0	24	6
Mr. Fiske, Troston.	15	6	18	0
Mr. Cobbold, Sutton.	17	0	23	6
Mr. Barret, Sutton.	16	9	22	6

CRONES.

Mr. Barrett, Sutton. 15s.

KINGUSSIE LAMB FAIR, Tuesday.—The appearance of the stock was but indifferent. Several sales, however, took place. Shot lambs, 2s.; second lambs, 3s. 6d.; cross lambs, 5s.; top wedder lambs, 6s.; blackfaced top lambs, 5s. 4d. Several wool buyers from Inverness were present, and some transactions in blackfaced took place at 8s. to 8s. 3d. per stone. Large clips fetched 8s. 6d. A market for lambs was held the previous day at Llynwyl.

LELANT FAIR was thinly supplied with cattle of every kind; few bargains were effected, and those at low prices.

LUDLOW FAIR was rather thinly supplied with sheep. Good ewes and wethers sold remarkably well, whilst those of an inferior description met with a dull sale. There was a large supply of pigs, and the trade was very dull, prices having a downward tendency.

LOCKERBY LAMB FAIR.—The number was rather above than under 50,000. Cheviot first-class wedder lambs brought generally from 11s. to 12s., and we only heard of one instance in which the price was 12s. 6d. Lowest prices of this class from 7s. to 8s., and the greatest number disposed of at from 9s. to 10s. Cheviot ewe lambs up at least 6d. above the currencies of last year. In the great and increasing class of half-breeds the prices for the best lots ranged from 19s. to 21s., and in one reported case, by private sale, the terms popularly were called 22s. 6d. These, however, were the "tip-tops," and speaking more generally, the prices ranged from 16s. 6d. to 14s. 6d.; and in all cases there was an advance over 1846, which some estimated at 1s. 6d. per head. That such cases existed we have no doubt, but still they were few and far between. Cross-breeds from 6s. to 8s., and blackfaced from 6s. 6d. to 7s. Altogether the market was a brisk one.—*Agr. Advertiser.*

NEWARK FORTNIGHT FAT STOCK MARKET.—There was a very numerous attendance, both of buyers and sellers. A good amount of business was done at rather higher prices. There were 737 sheep and 98 beasts penned.

NEWPORT FAIR (Thursday) was well attended. Prime stock sold readily, but at low rates. There was a poor show of horses.

NEW ROMNEY FAIR, Aug 21.—Up to two o'clock 8,209 lambs had been sold, averaging 17s. 1½d.; 1,028 old sheep, averaging 27s. 4d.; 642 wether tegs, averaging 27s. 6d.; and 748 ewe tegs, averaging 26s. 10d. The total number of sheep and lambs penned was 16,143, being a decrease from last year of 790. There were some exceedingly fine fat sheep exhibited; and in a field of Mr. Parton's, adjoining the market, some fine beasts were also shown. 30s. per head was refused by Mr. Parton for his old sheep, being many of them fit for the butcher. There were plenty of buyers, and business went off briskly. A number of nag and draught horses were also offered for sale.

PETERBOROUGH FAT STOCK MARKET.—On Wednesday last there was a tolerably good supply of beasts, which met a better demand at higher prices: 6s. per stone was readily obtained. There were above 500 sheep, which sold at about last week's prices, and were cleared off early. Calves were more sought for. Pigs, 5s. per stone; some store pigs, from four to five months old, fetched 15s. each. On Saturday an increasing quantity of stock; several lots of steers at from £8 to £12 each; culled ewes, 22s. each.

STOWMARKET FAIR was considered one of the worst for some time past; there being little more than half the usual show, and the trade heavy throughout. Prices ranged as under: Lambs, from 14s. to 28s.; store sheep, 24s. to 32s.; stock were 32s. to 37s.; store beasts, £2 15s. to £10.

SHREWSBURY FAIR.—A large number of cattle, and a good attendance of buyers. Prime beef fetched 5d. per lb.; inferior animals, 4½d. There was a brisk demand for stores; likewise for cows and calves. Sheep and lambs were eagerly bought up; fat wethers averaging 5½d.; lambs, 6d. per lb.; store sheep, 30s. to 35s. each. Pigs were a shade lower than last fair. The supply of cheese was large for the month, consisting of small lots of new of late makes. Many buyers were present. Best lots fetched from 45s. to 55s.; middle do., 40s. to 45s.; 34s. was refused for a lot of old skims. Bacon and hams, 5½d. to 6½d.

TAVISTOCK FAIR, on Wednesday last, was the largest we have had for some years. It was full of all kinds of cattle, and met with a very good sale, although not much advance in prices. Upwards of 700 bullocks and 1,000 sheep and lambs, exchanged hands. Fat cows brought from 42s. to 45s. per cwt.; steers, from 34s. to 38s.; sheep, 42d.; lamb, 5d. to 5½d. per lb. Very few cattle of any sort in the market this day (Friday).

THETFORD LAMB FAIR, Aug. 22, has not been so well attended, nor has there been so much good business done for many years past; prices being better than could have been anticipated. A general activity prevailed from early morn throughout the day, and prices ranged as under: Black-faced ewes, 18s. to 25s.; shearlings from consumption, from 25s. to 37s.; half-bred Leicesters, 12s. to 21s.; crones, from 12s. to 18s. Mr. Bennett exhibited about 30 prime Leicester tups, which were sold by auction at from £5 10s. to £8 each.

WINSLOW FAIR (Wednesday) was well supplied with stock, and business was in most instances brisk. The trade in cow stock rather slow, but remunerating prices were obtained. Milch cows from £12 to £16, including the small calf; young heifers, from £10 to £14. The trade in sheep and lambs was very brisk, and an early clearance of the large supply was effected at the following prices: Half-bred ewes, 24s. to 32s.; store lambs, 20s. to 28s.; fat lambs, 3s. 6d. to 4s. per stone.

IRISH FAIRS.—**DUNLEER** was rather crowded, and the demand brisk. Lambs sold at a remunerating price to the farmer, and young horned cattle of good quality met brisk sales. Pigs sold very high. The horse fair was bad, and the description of animals indifferent. **MULLAGHCREW** was well attended. Prices were in general low, and the sales few. Sheep, however, sold well; lambs from 18s. 6d. to 20s. Beef rated at from 35s. to 40s. per cwt. Horses were in considerable number, and of a good kind, but the sales effected were few. On the whole, the fair was dull, and money scarce. **BALLYNAHINCH** was but thinly attended. The show of cattle, horses, &c., was small. There were a good many suckling pigs brought forward. Store pigs were plenty, but owing to the rumours of disease, no great anxiety to purchase was manifested. **CARRICK.**—There was a good supply of all descriptions of stock; fat cows 30s. to 35s. per cwt.; milch cows from 7l. to 10l.; store pigs, 28s. to 30s.; mutton, 4d. to 4½d. per lb. A good supply of horses, but very few good ones; many exchanged owners. The prices obtained for cattle, &c., sold was remunerative. There was a tendency to riot towards evening; but Head Constable Orr had the police so placed that with but few exceptions all passed off quietly.—**ROSCOMMON:** The fairs held during the week were not so brisk as they heretofore were. This may be accounted for in consequence of the graziers having all their stock bought in. Ballynahon was dull, and so was Castleplunket. Fat sheep appeared to be very scarce, and prices were rather higher than ever remembered at this season of the year. Mutton cannot be had under 5d. to 6d. per lb. Beef is plentiful, and selling at 4d. per lb.—*Roscommon Journal.*—**SLIGO** was a favourable one for the farmers. Horned cattle were rather scarce; prices from £9 to £13. Store heifers were also scarce, but realised fair prices. Sheep were in good demand, and a good supply offered; prices from 30s. to 36s. There

was also a good show of horses, and many changed hands at remunerative prices. Spencil-hill beef rated 35s. per cwt., and mutton at 5d. per lb., sinking offal. William Kenny sold three cows at £10 3s. 4d. each; John Cullinan, three ditto at £8; Thomas Crowe, four Kerry's at £7 10s.; H. O'Keefe, five ditto at £5 10s.; one bullock at £10 10s.; lambs from 20s. to 24s.; James Frost sold twenty sheep at 30s. per cwt. Horses in demand, but no supply of good ones.

We apprehend that but few of our readers are aware of the extent to which the Corporation of the City of London propose to increase the tolls upon cattle sent to Smithfield market, in order to enable them to perpetuate the old system, and secure the monopoly now enjoyed by certain parties, to the loss and damage of the feeders of stock of at least £200,000 per annum as observed in the preceding article.

Existing tolls the same as at Islington Market.	Increased tolls for Smithfield, proposed by the Corporation.
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Beasts	1d. toll	1d. tie	8d. each
Sheep & Lambs .	1-10th of a penny each	..	½d. each
Pigs	1-5th of a penny each	...	1d. each
Calves	1d. tie each	.....	2d. each

Further graduated regulation tolls on cattle, &c., leaving market after 7 o'clock, A.M. proposed in addition.

Before 8 o'clock	Beasts	2d each	..	Sheep, 4d. per score.
Before 9	Do.	4d. each	..	Do. 8d. "
Before 10	Do.	6d. each	..	Do. 1s. "

BONE-PREPARATION FOR MANURE.—There are three processes now in use for reducing bones to the crumbly or powdery state fit for manure: 1. Grinding, by which the harder parts are not often reduced much within a quarter of an inch in diameter: 2. Mr. Blackhall's steaming process, by which they are rendered tender and porous, and particularly suited for the action of acid to make the superphosphate. 3. Fermentation in heaps, with earth, sand, or saw-dust, introduced by Mr. Pusey, wherein ammonia being generated the bone acquires some of the qualities of guano; but is rendered unfit for the action of acids, which ammonia would neutralize. It becomes, then, an interesting question, which of the three is the most practically effective and eligible. Mr. Pusey's has the advantage of requiring no apparatus, and no great skill; so that it may be done by almost any farmer at home; if the waste of ammonia is duly prevented, it will have the effect of a mixture of bone-dust and guano—a result of some value, now that guano is so much in demand, and so largely adulterated. Mr. Blackhall's product is the neatest, and as fit for the action of the acids in the soil as of the sulphuric above-mentioned. But how it competes in point of economy with the old process of grinding; how the fermented bone competes with the superphosphate in fertilizing power; and how the three kinds, crushed, steamed, and fermented, compete in cost and effect, without addition of acid, are questions on which light may be thrown by successive reports of the experiments now in progress in England, Scotland, and Ireland; likewise, if the experimenters will favour us with such reports from time to time.—**J. PRIDEAUX.**

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
July 22	29.97	29.94	57	78	66	S. Easterly	lively	fine	sun	fine	dry
23	29.94	29.83	60	83	64	E. by South	brisk	fine	cloudy	cloudy	showers
24	29.92	29.93	56	73	59	S. Westerly	gentle	fine	sun	fine	dry
25	29.83	29.65	56	63	57	S.E., S.W.	variab.	cloudy	cloudy	fine	shower
26	29.65	29.75	52	68	59	W., W. by N.,	lively	fine	cloudy	fine	dry
27	29.75	29.78	54	58	54	W., Northerly	gentle	cloudy	cloudy	fine	wet
28	29.90	30.00	54	63	56	N., N. by E.	gentle	cloudy	cloudy	cloudy	rain
29	30.08	30.12	54	72	60	N. by East	lively	cloudy	sun	fine	rain
30	30.14	30.16	56	71	61	East, Variable	calm	cloudy	fine	fine	dry
31	30.15	30.10	57	75	64	Var., W. by N.	gentle	cloudy	fine	cloudy	dry
Aug. 1	30.18	30.15	60	72	62	N. by East	calm	cloudy	cloudy	cloudy	dry
2	30.13	30.04	57	65	61	W. by South	gentle	cloudy	cloudy	fine	dry
3	30.05	30.03	59	73	63	Wly., W. by S.	gentle	fine	sun	fine	dry
4	30.03	29.88	58	73	62	S. West	brisk	fine	sun	fine	dry
5	29.83	29.70	57	77	65	Westerly	gentle	fine	sun	fine	dry
6	29.74	29.74	60	70	60	N.E., S.E.	gentle	fine	cloudy	cloudy	rain
7	29.90	29.87	53	73	60	W. S. W.	gentle	fine	sun	cloudy	rain
8	29.76	29.70	59	67	62	W. S. W.	gentle	cloudy	cloudy	cloudy	rain
9	29.72	29.74	55	68	59	S. West	strong	cloudy	fine	fine	rain
10	29.80	29.86	54	72	62	W. S. W.	brisk	cloudy	sun	cloudy	rain
11	29.86	29.74	57	69	56	S. Westerly	brisk	fine	cloudy	fine	dry
12	29.70	29.81	53	68	56	Var., E. by N.	variab.	cloudy	cloudy	fine	rain
13	29.84	29.90	53	68	61	N. by West	gentle	gloom	sun	fine	dry
14	30.01	30.00	58	72	62	N. by East	gentle	cloudy	sun	fine	dry
15	30.00	29.96	50	66	59	N. by East	gentle	cloudy	cloudy	fine	rain
16	29.96	29.98	56	74	65	N. by East	gentle	fine	sun	cloudy	dry
17	30.00	30.01	59	73	64	S.W., N.W.	gentle	cloudy	fine	fine	dry
18	30.02	29.79	57	71	61	W. S. W.	rising	cloudy	cloudy	cloudy	dry
19	29.80	29.76	53	66	54	Westerly	forcib.	fine	sun	fine	dry
20	29.68	29.70	48	66	53	Westerly	v. brisk	fine	sun	fine	dry
21	29.66	29.60	51	58	48	S.E., N.W.	gentle	cloudy	cloudy		

ESTIMATED AVERAGES OF AUGUST.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.26	29.35	82	41	61.6

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
69.84	56.	62.92

WEATHER AND PHENOMENA.

July 22—Fine and hot streamer, indicate change. 23—Sultry thunder-clouds. 24—Very pleasant; cirrus. 25—Repeated showers. 26—Lively, and pretty fine. 27—Showers. 28—Hint of rain. 29—A few drops of rain. 30—Finer. 31—Oppressive; changeable.

LUNATION.—Full moon 5h. 24m. morn.

Aug. 1—Close, oppressive. 2—A few drops; red sunset. 3—Fine; cirrus clouds. 4—Beautiful. 5—Sultry; fine lightning, clouds after sunset. A spot or two on the sun's disk on the 4th and 5th. 6—One drenching shower. 7—Beautiful, A.M.; rainy evening. 8—Damp and oppressive. 9—

Some gleams; high wind. 10—Fine day; small rain in the afternoon. 11—Much the same. 12—Thunder clouds and showery. 13—After smoky haze, fine harvest weather. 14—Fine. 15—About three hours' small rain early. 16—Fine harvest weather. 17—Fine and drying. 19, 20—Cold fierce wind, very drying; much corn carried. 21—Drenching rain.

LUNATIONS.—Last quarter, 1st day, 5h., 17m. morning. New moon, 7th day, 9h., 34m. afternoon. First quarter, 14th day, 5h., 46m. afternoon.

REMARKS REFERRING TO AGRICULTURE.—The average temperature of night and day has been rather in excess. The corn is fine, and much was secured before the only soaking rain of the 21st. Quality, we believe, will be found exceptional; that of potatoes very fine, far better than since 1845. Some haulm is gone, but growers and dealers report the tubers to be sound. Time will prove.

Croydon.

J. TOWERS.

REVIEW OF THE CORN TRADE DURING THE MONTH OF AUGUST.

With August fast drawing to a close, nearly half of the corn crops of Great Britain are still in the fields, and the harvest is later than it has been for several years past. The summer has certainly not been of a favourable character for the growth of wheat, and we much fear that that crop will prove deficient in quantity, and inferior in quality to the produce of moderately good average seasons. Cutting scarcely commenced until the end of the first week in August, and harvest-work has since suffered repeated interruptions, owing to frequent heavy showers: farmers have, however, managed to take advantage of the intervals of fine weather, and in the southern parts of the kingdom large breadths of land were cleared during the week ending 24th instant; but even in the immediate neighbourhood of the metropolis there is still corn in the fields, whilst in the north and east comparatively little has yet been carted. Under these circumstances it is impossible to foresee what may be the ultimate result of the harvest; but sufficient is known to lead to the conviction that the wheat crop will prove deficient. The accounts from all quarters agree on that point; but the extent of the deficiency is so variously estimated as to render any accurate computation out of the question at present.

Till about the middle of June the promise was very good; the plant was thick on the ground, and its general aspect denoted health and vigour; indeed, all went on well until the 19th of June, on the night of which so severe a frost was experienced in most parts of the kingdom as seriously to check vegetation; and though this was not much thought of at the time, it has since been proved that material injury was done thereby to all the early kinds of wheat then in ear. To this visitation we are inclined to attribute the prevalence of blight in the white wheat, and the consequent deficiency in many of the ears. The next unfavourable occurrence was the high wind and heavy rain with which most parts of the kingdom were visited, at the period when the wheat was in bloom, and subsequently, when the head began to become weighty. So large a proportion was beaten down and lodged that all along the south coast the fields appeared as if a roller had been passed over. Circumstances have not improved much since the commencement of harvest, the weather having throughout the month of August been

changeable; we fear, therefore, that farmers will receive but a poor return for all their toil and anxiety. In the most favoured districts the produce of wheat will certainly not exceed an average, and in many parts of the country the deficiency will be serious, particularly on the fen lands in Lincolnshire, Cambridgeshire, &c.

Barley was well spoken of till very recently, and we are still of opinion that the acreable yield will be good; the quality is, however, almost sure to be coarse, and only a comparatively small proportion is likely to be suitable for making malt. This is the more to be regretted on account of the competition which our growers must expect. Had the barley crop proved of fine quality the foreign imports would not have been so much felt, as the latter generally consist, for the most part, of distilling and grinding sorts, and the English grower would still have had the benefit of supplying the maltsters; but with the home growth inferior, and the foreign better than usual, the latter is quite as likely to find favour as the former.

Oats do not appear to have been very extensively sown in England: this crop, like all others, has suffered from being lodged by the heavy rains, but to a less extent than either wheat or barley; and in proportion to the acreable breadth, the yield will, we believe, be tolerably good. We shall, however, depend in a great measure on other parts for supplies, and the future range of prices will, in some measure, be regulated by the result of the harvest in Ireland.

Reports hitherto speak well of the oat crop in the sister isle; but whether there will be any great surplus for shipment to England must depend on the result of the potato crop. In case any large portion of that root should be lost by the disease (as there is too much reason to fear will be the case) a materially increased consumption of oatmeal in Ireland would cause the bulk of the oats grown there to be required for the support of her own people. This mysterious disorder seems still to be as little understood as when first it made its appearance in these islands, now four years ago. Nothing has yet been discovered to guard against the attack; and though a variety of experiments have been tried to check the progress of the blight, we cannot say that any very beneficial results have hitherto followed. The disease is, we think, quite as prevalent in England as last year; but as the

breadth of potatoes planted was greater, and the yield large, the destruction of a portion would not be greatly felt in a national point of view, provided we could be sure that that part apparently sound would keep; but the doubt on that subject causes a larger quantity than is immediately required to be forced on to the markets, reducing prices, and leading to a lavish consumption. This is more particularly the case in Ireland than on this side of the channel, and it is to be feared that the present abundance will be followed by scarcity and high prices during the winter. It is totally impossible to place dependence on the accounts from Ireland in regard to the extent of the potato disease; this we do not attribute to any wilful design to deceive, but to the want of care in collecting authentic information. Any one, who will refer back to the reports which have appeared in the Irish papers during the last month or six weeks, must at once be struck by the glaring contradictions which these have put forth. One day we have been told that the potatoes are all destroyed; a short time after we hear that only the haulm had been affected, and that, upon digging, the tubers were discovered to be sound. This favourable version is perhaps again followed by assertions of an opposite character, till the subject becomes so perplexing as to defy anything like a definite conclusion to be arrived at.

That the extent of the potato disease will have a material influence on the future range of prices of food, cannot be questioned; and lacking accurate information on that important point, we are unable to speak positively as to what may hereafter be the value of wheat. We are, however, of opinion that the imports from abroad will be on too extensive a scale to allow of any rise of importance on present quotations; and being quite convinced that existing prices will not remunerate our farmers, with a yield such as this year is likely to prove, we view the prospects of our agricultural friends as decidedly worse under free trade with short than with good crops.

The grain trade has since our last remained quiet. The doubt and anxiety felt respecting the result of the harvest have sufficed to prevent any decline in prices taking place; whilst the continued arrival of large supplies from abroad, and the generally auspicious accounts of the probable result of this year's crops over a large part of continental Europe, have tended to render buyers cautious.

A retrospective view of what has occurred at Mark Lane will enable our readers to form an opinion of the actual state of affairs, as the changes there have been pretty closely followed at the other large consuming towns. The arrivals of English wheat into the port of London have at no period

of the month been large; indeed, so scantily has the market been supplied at times, that had it not been for foreign the millers would occasionally have run short. The trade at Mark Lane has, nevertheless, remained quiet; and, considering the weather, the reported deficiency in the crops, and the spread of the potato disease, a remarkable degree of apathy may be said to have characterized the proceedings of our buyers. The tendency of prices was rather upwards in the early part of the month, but no quotable advance was established, and within the last week or two sellers have experienced considerable difficulty in realizing previous prices. No new wheat appeared in the London market until the 12th, and the quantity then exhibited was quite trifling; on the following Monday we had, however, a good supply, more than half of the samples on the Essex stands, and a fair proportion of those from Kent, being of this year's growth. The quality was, on the whole, better than expected: very few of the parcels then shown weighed less than 60lbs. per bush. The average weight was probably 61lbs., but a good many lots were 1lb. to 2lbs. heavier than the last-named weight. For the best samples of red 43s. to 45s., and for superior white up to 50s. per qr. was asked. A few picked lots realized the extreme rates quoted; but since then the top price has settled down to 44s. for red, and 48s. for white. On Monday, the 26th instant, nearly the whole of the Essex supply consisted of new, but from Kent the greater proportion was old. There was no falling off in quality; still some difficulty was experienced in realizing the terms of that day week for new, and old was in some cases sold 1s. per qr. lower than the preceding Monday.

The supplies of foreign wheat have more than kept pace with the demand, the arrivals into London having averaged over 20,000 qrs. per week; at the ports on the coast the receipts have also been liberal, and the stocks in granary have certainly accumulated. We observe from the official return that during the month ending 5th inst., nearly half a million of quarters of wheat, and 241,000 cwts. of foreign manufactured flour, were entered for home consumption in the United Kingdom. It is impossible to come at the actual quantity on hand, but we are decidedly of opinion that merchants and millers hold more foreign wheat at present than they have done at any previous period for some time past. The weather has been of a character to induce all prudent men to keep up their stocks, and prices have been sufficiently moderate to enable buyers to do so without running any great risk. There has, however, been no speculation beyond what we have just referred to, parties not immediately connected with the

trade having manifested no disposition to invest capital in corn. The value of foreign wheat has not varied much since the close of last month. Polish Odessa must still be quoted 38s. to 40s., superior probably 1s. to 2s. per qr. higher. Baltic, Dutch, French, and Belgian red may be all embraced in a quotation from 40s. to 45s., if we except Rostock, which has realized 46s., and in some cases even 47s. per qr. Danzig, of which we have a larger quantity in warehouse than of any other kind, varies in value from 42s. up to 50s. per qr. The finer sorts being scarce, are relatively dearer than the lower descriptions.

The nominal top price of town-made flour has not varied since our last; the bakers have bought with a good deal of caution, but they have been unable to obtain any advantage. The arrivals of the article coastwise and by railway, into London, have been quite moderate; and fresh ground country flour has sold pretty freely, at terms fully as high in proportion as the prices paid for the best London marks. The stock of French on the wharves has gradually diminished, and as the latest advices from thence would lead to the conclusion that no further shipments were likely to be made to this country, enhanced rates have been asked within the last week or two for the finest sorts.

The last crop of home-grown barley having been quite exhausted, and no supplies of new having yet made their appearance, hardly anything has been done since our last in English barley, in which position of affairs quotations have remained nominally unaltered. A small lot or two of new from Kent appeared on the 26th, which being of good quality realized 28s. per qr., the weight was 53 to 54 lbs. per bushel. Foreign has come rather freely to hand, but the absence of home supplies has caused a good steady demand for grinding qualities, which have brought prices similar to those current at the close of July, say 19s. to 20s. for the lighter sorts, and 21s. to 22s. per qr. for heavy sweet parcels. The prevailing belief is that the quality of the new English barley will prove coarse, and that fine malting samples will command good prices. We have seen samples of new Saale barley from Hamburg, of fine colour but not heavy; still, if our crop should turn out as inferior as many anticipate, our maltsters would probably import some of the best sorts of foreign for malting.

Holders of malt have raised their pretensions of late, and the best sorts could not at present be bought so cheap as in the early part of the month.

The arrivals of home grown oats into the port of London have been very small, indeed beyond a few trifling lots from Lincolnshire, and a cargo or two from Scotland, nothing has come to hand since the close of July; having, however, received liberal

supplies from abroad, the paucity of the receipts coastwise has scarcely been felt. The trade has at no period of the month been lively, but factors have displayed considerable firmness, and prices have on the whole rather tended upwards. Fair to good Scotch feed are at present worth 20s. to 22s., and superior potato would, if any were on the market, realize relatively high rates. Light foreign feed may be quoted 15s. to 16s., and the finer kinds from 17s. to 18s. 6d. per qr. The principal dealers are tolerably well stocked, and the consumption of oats in the metropolis usually falls off about this time of the year, still we think that good old corn, whether of home or foreign growth, is likely to maintain its value, as there can be no doubt that of the former scarcely any remains on hand, and that we shall consequently have to depend almost entirely for supplies on what may reach us from abroad, new oats being unfit for feeding for some months after harvest.

The result of the bean crop is very indifferently spoken of; having, however, still fair stocks of old on hand, the article has not hitherto risen materially in value, but the tendency has been decidedly upwards. Good ticks have lately been held at 25s. to 26s., harrows at 26s. to 28s., and handsome samples at 30s. to 32s. per qr. For Egyptian beans a steady consumptive demand has been experienced, and the finer sorts in granary have not been offered below 21s. per qr.

Peas are reported to be a short crop, not only in this country, but likewise on the continent. Judging by the samples of new which we have hitherto seen, we should pronounce the quality inferior to the produce of late years. New white boilers have risen in value, 30s. to 32s. per qr. having lately been realized, and old have also been held at enhanced rates; grey and maple may be quoted 26s. to 28s. per qr.

Notwithstanding the reports of potato blight from Ireland, Indian corn has excited little attention since our last. Even at Liverpool, where the largest amount of business is usually done, the transactions have been comparatively unimportant. Till nearly the close of the month the tendency of prices was decidedly downwards; but within the last week or two, the Irish demand having partially revived, a few sales have been made, and 6d. per qr. of the decline has been recovered.

There has been comparatively little business done during the month in wheat free on board, at foreign ports, owing in a great measure to the high pretensions of sellers, more money having been asked than the prices current on the spot have warranted. The fact is that the foreign growers have been encouraged by the unfavourable reports from hence, respecting the probable result of our harvest, to

speculate on high prices, and for the moment quotations are relatively higher abroad than in this country; whether this will continue to be the case when the supplies of the new crop begin to come more freely forward at the principal continental ports, remains to be seen.

Over most of the northern parts of Europe wheat has given a very good return; and, though the shortness of the rye crop in many parts of Germany, Holland, and Belgium will, unquestionably, cause an increased consumption of wheat in those countries, still there is reason to believe that there will remain a large surplus for shipment to Great Britain.

The latest advices Danzig (22nd inst.) inform us that harvest had been concluded in the neighbourhood of that town, and that the new wheat was of fine quality. Supplies had scarcely begun to come forward, but there were still fair stocks of old in granary. Notwithstanding this circumstance, holders had remained tolerably firm, and the reduction in prices from the highest point attained during the month had not exceeded 1s. to 2s. per quarter. The best high-mixed qualities were then still held at 44s. to 45s., fine high-mixed at 42s. to 43s., and other sorts at corresponding rates. Moderately good qualities of mixed Upper Polish wheat had, however, been offered at 38s. to 39s. per quarter. Few purchases had for some days been made on British account; the business done having been principally on speculation.

Königsberg letters of the 20th August state that the crops were all secured in that vicinity. Wheat was highly spoken of, both as to quantity and quality; but spring corn and pulse would prove short, and rye very deficient. In the latter article a considerable extent of business had been done, partly for consumption and partly on speculation, which had caused prices to tend upwards, and good qualities were then worth 19s. 6d. to 20s. 6d. per quarter, free on board. The samples of new rye brought to market had proved of uncommonly fine quality, weighing, in some cases, 60 lbs. per bushel. In wheat there had not been much passing, the orders received having been limited too low to allow of their execution. A parcel of good high mixed, weighing about 61 lbs., had, a few days before, been purchased, on Danzig account, at equal to 40s. 6d. per qr., free on board.

From Stettin we learn that harvest-work had been concluded fully ten days earlier than in ordinary seasons, and that the grain had been carted in excellent condition, and that the yield of wheat was expected to turn out satisfactory. A lively English demand being however anticipated, and there being no immediate pressure on the market, owing to old stocks having been reduced into a narrow compass,

and but little new having yet come forward, previous prices had been steadily supported, 42s. per quarter having been demanded for Pomeranian of 62 lbs. weight, 40s. to 41s. for Uckermarks of 61 lbs. to 62 lbs., and 39s. to 40s. per quarter, free on board, for Stettin, weighing 61 lbs. per bushel. In barley and oats little business had been done, but rye had been in active request, at enhanced rates.

The accounts from Rostock, Stralsund, Greifswald, &c., speak in high terms of the quality of the new wheat, and of the prosperous manner in which the harvest had been concluded; indeed, we may say that hardly a complaint has reached us, either from the Upper or the Lower Baltic ports, relative to the wheat crop. All kinds of spring-sown corn and rye seem to have suffered from drought. Prices abroad will, of course, in a great measure, be regulated by the extent of the English demand. The notion that Great Britain will require to import largely appears to be so general all over the Baltic, that quotations are likely to be sustained above what they otherwise would have been, after so good a harvest as that with which the foreign growers have been favoured.

From Denmark and Holstein we have no very authentic reports at present respecting the result of the crops, but the season appears to have been of the same character there as in other northern countries.

At Hamburg prices have fluctuated, according to the more or less encouraging tone of the advices from hence; the rapid communication, and the low freights to London and Hull, render the Hamburg market particularly sensitive of every move, up or down, which occurs here. By the latest accounts (23rd inst.), light 59½ lbs. to 60 lbs. red Upland wheat was obtainable at 38s. to 38s. 6d., and 60 lbs. to 60½ lbs. parcels at 39s. per quarter, free on board.

In Holland and Belgium the weather continued fine till about the middle of August, but subsequently very heavy rains fell; previous to which, however, the greater proportion of the corn crops had been harvested; still, a good deal of damage is said to have been done by the floods, caused by the overflowing of the rivers and water-courses in the flat low-lying lands. Some speculative inquiry had, consequently, sprung up for wheat and rye, and prices had advanced to an extent which have brought quotations up to ours, as much as 46s. per quarter having been paid, at Antwerp, for 62 lbs. red Louvain wheat, and 41s. 3d. to 42s. per quarter, free on board, at Rotterdam, for fine 62½ lbs. to 63 lbs. red Rhine.

The more recent reports from France speak much less favourably of the result of the harvest than did

the previously received accounts, and it has become questionable whether that country will be in a position to export so largely as she has done since last harvest. Wheat and flour have lately risen in all the principal French markets, and prices are at present as high there as at Mark Lane, which will have the effect of stopping further immediate shipments to Great Britain.

From the Black Sea and the Azoff the advices state that the wheat crop was likely to prove short, and that little would be exported, unless prices advanced.

We have advices of recent dates from the United States and Canada, but they do not enter so fully into the prospects of the grain harvest as we could wish. Generally, however, the accounts allow that the yield is likely to be good, and this appears to be borne out by the fact that prices, after having remained firm all through the summer, had begun to recede at most of the principal markets.

At New York the value of flour declined from 25 to 50 cents per barrel between the 30th July and the 14th August; fine brands were then worth $4\frac{1}{2}$ to $4\frac{3}{4}$ dols., and No. 2, superfine, 3 dols. $87\frac{1}{2}$ cents to 4 dols. per barrel. 34,597 barrels had been shipped from thence during the fortnight.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	NEW	OLD.
WHEAT, Essex and Kent, white	46 to 48	42 to 50
Ditto, fine selected runs	42 50	49 51
Ditto, red	42 43	43 44
Ditto, extra	43 45	44 45
Norfolk, Lincolnshire and Yorkshire ..	—	41 44
Ditto, white	—	43 46
BARLEY, English, malting and distilling ..	—	24 26
Ditto, Chevalier	—	27 28
Ditto, grinding	—	20 22
MALT .. Essex, Norfolk and Suffolk	43 45	44 48
Kington, Ware, and town made	45 52	48 54
OATS, Essex and Suffolk	—	16 17
Lincolnshire and Yorkshire (Polands) ..	—	18 19
Ditto, feed	—	16 17
Devon & West Country, feed	—	14 16
Northumberland and Scotch, feed ..	—	18 22
Dundalk, Newry, and Belfast, potato ..	—	16 18
Limerick, Sligo, and Westport, potato ..	—	16 19
Ditto, feed	—	15 17
Cork, Waterford, Dublin, Youghal, and ..	—	—
Clonmel, black	—	14 15
Ditto, white	—	14 16
Galway	—	12 14
BEANS, Mazagan	—	24 26
Tick	—	25 28
Harrow	—	28 30
Pigeon, Heligoland	—	28 30
Windsor	—	25 27
Long pod	—	25 28
PEAS, non-boilers	—	24 26
White, Essex, and Kent, boilers	28 30	26 28
Ditto, fine Suffolk	30 31	29 32
Maple	26 28	27 28
Hog and grey	25 26	26 27
FLOUR, best marks (per sack of 280 lbs.) ..	—	35 40
Norfolk and Suffolk, ex-ship	—	29 34
RYE	—	21 23

FOREIGN GRAIN.

	Shillings per Quarter.
WHEAT, American, white	42 to 46
Canada	none —
Dantzic and Konigsberg	44 48
Dantzic, fine white, extra quality	48 50
Stettin and Hamburg	40 44
Danish	39 42
Rostock, Pomeranian and Rhine	43 47
French and Belgian, white 42s. to 45s.	40 44
Mediterranean, Odessa, and St. Petersburg ..	35 39
Black Sea (nominal) hard to soft	35 38
Buck or Brank	23 26
BARLEY, malting	22 24
Grinding and distilling	21 22
Hamburg, Dantzic, Konigsberg, and Riga ..	19 21
Danish, Mecklenberg, and Pomeranian	19 21
OATS, Dutch, brew. Poland, Friesland, and Groningen	18 20
Danish and Swedish	15 18
Russian	16 17
BEANS Small	25 28
Egyptian	20 22
PEAS, white boilers	26 28
Yellow ditto	27 29
Non-boilers	24 26
MAIZE, white	27 29
FLOUR, American, sweet	23 25
Ditto, sour	21 23
Canadian, sweet	22 24
Ditto, sour	21 22
French, per sack	28 33
RYE MEAL (per ton)	£6 6s. to £6 10s.
INDIAN CORN MEAL (per brl. of 196 lbs.)	nominal

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
WEEK ENDING:	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
July 20, 1850 ..	42	4	22	3	17	9	22	7	27	5	27	11
July 27, 1850 ..	43	6	22	3	18	1	24	9	27	4	27	8
Aug. 3, 1850 ..	43	7	22	4	18	1	22	2	27	8	27	8
Aug. 10, 1850 ..	44	1	22	5	17	11	23	8	27	9	26	10
Aug. 17, 1850 ..	43	8	22	8	18	4	23	0	28	2	26	5
Aug. 24, 1850 ..	43	6	23	0	17	9	20	10	28	1	26	3
Aggregate average of last six weeks	43	5	22	6	18	0	22	10	27	9	27	2
Comparative ave. same time last year	47	4	26	2	19	2	26	9	32	1	30	11
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

LONDON AVERAGES.

£ s. d.				£ s. d.			
Wheat..	1,733 qrs.	2	6 4	Rye....	4 qrs	1	4 0
Barley..	—	0	0 0	Beans ..	273	1	7 0
Oats ..	511	1	0 6	Peas ..	150	1	8 1

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's Gazette.				Averages from the corresponding Gazette in 1849.			
	Qrs.	s.	d.		Qrs.	s.	d.
Wheat ..	81,760	43	6	Wheat ..	57,651	44	8
Barley ..	1,286	23	0	Barley ..	1,805	26	4
Oats	7,591	17	9	Oats	10,857	18	10
Rye	105	20	10	Rye	137	26	5
Beans ...	3,149	28	1	Beans ...	2,660	32	2
Peas	1,275	26	3	Peas	1,303	28	8

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING AUG. 17, 1850.

PRIOR.	July 13.	July 20.	July 27.	Aug. 3.	Aug. 10.	Aug. 17.
44s. 1d.	..	..	..	..	..	..
43s. 8d.	..	..	..	..	..	..
43s. 7d.	..	..	..	..	..	..
43s. 6d.	..	..	..	..	..	..
42s. 6d.	..	..	..	..	..	..
41s. 3d.	..	..	..	..	..	..

PRICES OF SEEDS.

MONDAY, Aug. 26.

The transactions in seeds were altogether on a retail scale, and quotations of most articles remained nominally as before; we must, however, except new Mustard-seed, which was decidedly easier to buy, 8s. per bushel being the full value of white, and from 9s. to 11s. per bushel may be regarded as the range for brown.

BRITISH SEEDS.

Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.	
Linseed Cakes (per 1,000 of 3lbs. each) .. £8 0s. to £9 0s.	
Coa (Grass (nominal))..... —s. to —s.	
Trefoil (per cwt.)..... 14s. to 18s.	
Rapeseed, (per last) new £23 to £25 .. old £— to £—	
Ditto Cake (per ton)..... £4 15s. to £5 10s.	
Mustard (per bushel) white.. 8s. to 9s.; brown, 12s. to 14s.	
Coriander (per cwt.)..... 16s. to 24s.	
Canary (per qr.) new .. 56s. to 63s.	
Tares, Winter, per bush., 5s. 0d. to 6s. 0d.; Spring, nominal.	
Caraway (per cwt.)..... new, 30s. to 32s.; fine 33s.	
Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.	
Cloverseed, nominal.	

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.	
Ditto, white (duty 5s. per cwt.) per cwt. .. 24s. to 42s.	
Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.	
Linseed Cake (per ton)..... £6 0s. to £7 10s.	
Rape Cake (per ton)..... £4 4s. to £5 0s.	
Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 34s. to 36s.	
Tares, (per qr.)..... small 21s. to 24s., large 25s. to 30s.	
Rye Grass (per qr.)..... —s. to —s.	
Coriander (per cwt) .. —s. to —s.	

BOROUGH HOP MARKET.

BOROUGH, AUGUST 26.

The few Hops of last year's growth remaining on hand meet with a slow sale, at the quotations of this day week. Two pockets of new hops have been received at market, but no supply is expected for three or four weeks.

The duty is estimated at £200,000.

Sussex Pockets.....	95s. to 112s.
Weald of Kent ditto.....	115s. to 130s.
Mid. and East Kent ditto ..	132s. to 240s.

WORCESTER, (Saturday last).—The reports from the planters are generally less favourable to-day, the high winds and cold nights being against the crop. Duty is called £20,000, but more against than in favour. Market very quiet for old hops.

MAIDSTONE, August 22.—Our hops have been put upon short time again this week, instead of having the chance of working extra hours; which are essentially necessary after the delays and hindrances to which they have been lately subjected. Last Friday and Saturday were the only really fine, warm, and sunny days that we have had throughout the week, when the hops appeared to respond to the weather and made good progress. Since then the days have been of a low temperature, and the nights cold. Yesterday was a complete rainy day, followed by a night approaching to, if not an actual frost, as some of the early risers have asserted. With such weather, the hops, of course, have moved but tardily; the bur comes very slowly into hop, and those that are out remain very small. The Golding's and other choice and delicate sorts cannot contend against this ungenial weather, and if we do not soon have a great improvement in that respect, we forebode that many of our choice Mid Kent growths will come very short of the quantity that their hitherto promising appearances have led the planters to expect. To-day we have again had some smart showers at intervals, with a cold and chilling atmosphere, and the duty in the market has receded from the statements in the Borough. A duty of £200,000 was laughed at in the market to-day.

COVENT GARDEN MARKET.

THURSDAY, August 29.

The supplies of both Fruit and Vegetables were again extensive; nevertheless, the general demand ruled steady at our quotations, which vary but little from those of last week.

ENGLISH FRUITS.		s.	d.	s.	d.
Apricots, per dozen		1	6	5	0
Pine-apples, per lb.		4	0	6	0
Hothouse Grapes, do.		2	0	5	0
Peaches, per doz.		4	0	12	0
Nectarines, do.		4	0	12	0
Melons, each		2	0	4	0
Figs, per doz.		2	0	3	0
Cherries, per lb.		1	0	1	6
Muscat of Alexandria Grapes, per lb. ..		4	0	6	0
Plums, per half sieve		2	0	3	
„ Orleans, do.		5	0	7	0
Apples, per bush.		1	6	8	0
Pears, do.		1	9	2	9
Walnuts, for pickling, per bushel ..		15	0	20	0
Filberts		0	10	1	0
Green Gages, per punnet		1	0	2	0

FOREIGN FRUITS.

West Indian Pine Apples	0	10	4	0
Apricots, per dozen	1	6	4	0
Lemons, per 100	6	0	12	0
Almonds, per peck.	5	0	6	0
Spanish Nuts, per peck.	4	0	5	0
Spanish Chestnuts, per peck ..	3	0	6	0
Brazil Nuts, &c.	3	0	4	0
Barcelona Nuts, do.	5	0	6	0

VEGETABLES.

Cucumbers, per dozen	1	0	5	0
Spinach, per sieve	1	6	2	0
Cauliflowers, per dozen	1	9	4	0
Horseradish, per bundle	1	0	4	0
Parsley, per dozen bunches	1	0	2	0
Cabbages, per dozen	0	6	1	0
Red Beet, per dozen	1	0	2	0
Mushrooms, per pottle	0	9	2	0
Small Salad, per dozen punnets ..	1	9	2	3
Sage, per dozen bunches	1	0	1	3
Globe Artichokes, per dozen	2	0	4	6
French Beans, per sieve	3	0	4	0
Cabbage Lettuces, per score	0	2	1	0
White Cos Lettuces, do.	0	9	1	6
Watercress, per dozen bunches ..	0	6	0	9
Mint, per dozen bunches	0	9	1	0
Peas, per sieve	3	0	6	0
Turnips, per dozen bunches	2	6	3	6
Carrots, do.	3	0	5	0
Turnip Radishes, per dozen bunches ..	0	9	1	0
Potatoes, per ton	50	0	85	0
„ per cwt.	2	6	4	0
„ per bushel	1	6	3	0
Broad Beans, per sieve	1	6	2	0
Sorrel, do.	0	6	0	9
Shallots, per lb.	0	6	0	8
Onions, per bunch	0	2	0	6
Vegetable Marrows, per dozen ..	0	6	1	3
Celery, per bundle	0	10	1	0
Leeks, per bunch	0	1	0	2
Fennel, per bunch	0	2	0	3
Savory, do.	0	2	0	3
Thyme, do.	0	2	0	3
Mint, do.	0	2	0	0
Garlic, per lb.	0	4	0	8

FOREIGN VEGETABLES.

French Carrots, per bunch	0	2	0	3
„ Beans, per half sieve	1	0	1	6
Cucumbers, each	0	1	0	2
Dutch Melons	1	6	2	4
Spanish Onions, per box	14	0	20	0

BREAD.

The prices of wheat Bread in the metropolis are from 6¹/₂d. to 7d.; and household do., 4¹/₂d. to 6d. per 4lbs. loaf.

ENGLISH BUTTER MARKET.

MONDAY, AUG 26.

We note a very dull trade in Butter, and although the price of the finest Dorset is nominally the same, the inquiry for it is very limited, while all stale and inferior parcels are neglected. The supply of fresh Butter exceeds the demand. The price of the best has receded 1s. per dozen, and lower qualities submit to a still greater reduction.

Dorset, fine weekly..... 78s. to 82s. per cwt.
Middling and stale ditto... 60s. to 68s.
Devon, new made..... 66s. to 72s.
Fresh, 7s. to 10s. per doz lbs.

BELFAST, (Friday last).—Butter: Shipping price, 64s. to 70s. per cwt.; firkins and crocks, 6½d. to 7¼d. per lb.: Bacon, 36s. to 40s.; Hams, prime, 64s. to 68s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 60s. to 62s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 42s. to 46s.; kegs or firkins, 40s. to 41s. per cwt.

Aug.	Butter,			Bacon,			Dried Hams,			Mess Pork		
	s.	d.	s.	s.	d.	s.	s.	d.	s.	d.	s.	d.
22.	87	0	89	0	55	0	72	0	66	0	74	0
1846	87	0	89	0	55	0	72	0	66	0	74	0
1847	87	0	88	0	64	0	57	0	75	0	82	0
1848	72	0	80	0	60	0	64	0	66	0	82	0
1849	60	0	66	0	48	0	50	0	68	0	75	0
1850	64	0	70	0	37	0	42	0	65	0	70	0

HAY MARKETS.

THURSDAY, August 29.

Old Meadow and Clover Hay, as well as Straw, moved off steadily at full prices, otherwise the demand ruled heavy.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechapel.
Meadow Hay, old..	53s. to 77s.	60s. to 78s.	58s. to 76s.
Ditto new.....	45s. 60s.	45s. 60s.	45s. 60s.
Clover, old	60s. 86s.	60s. 84s.	60s. 89s.
Ditto new	50s. 60s.	50s. 60s.	50s. 60s.
Straw.....	22s. 28s.	23s. 29s.	23s. 28s.

FLAX.

BELFAST, (Friday last).—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s. mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

BARK.

Per load of 45 cwt.

English, Tree.....	£13	0	0	to	£14	0	0
Coppice.....	14	0	0	to	10	0	0

OILS.

Linseed, 32s. 9d per cwt.; Rapeseed, English, refined, 37s.; do. brown, 35s.; Gallipoli, per tun, 42l.; Spanish, 41l.; Sperm, 84l. to 85l.; do. bagged, 83l.; South Sea, 34l. 5s.; Seal, pale, 31l.; Cod, 35l.; Cocoa Nut per ton, 38l. to 40l.; Palm, 32l.

HIDE AND SKIN MARKETS.

	s.	d.	s.	d.	per lb.
Market Hides, 56 to 64lbs.....	0	1½	0	1½	
Do. 64 72lbs.....	0	1½	0	2	
Do. 72 80lbs.....	0	2½	0	2½	
Do. 80 88lbs.....	0	2½	0	3	
Do. 88 96lbs.....	0	3	0	3½	
Do. 96 104lbs.....	0	3½	0	3½	
Do. 104 112lbs.....	0	4	0	0	
Calf Skins, light	2	9	3	6	each.
Ditto, full	4	0	5	6	
Horse Hides	6	6	0	0	
Lamb Skins	2	0	2	9	
Polled Sheep	1	8	2	2	
Downs.....	1	3	1	6	

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Aug. 23.—We have no change to notice this week either in demand or prices.

SHREWSBURY WOOL FAIR.—The show of wool was moderate, and was all sold. The prices were: Fleece from 12d. to 13d., lamb 10d. to 12d. per lb.

EXETER WOOL MARKET (Friday last).—There has been but little animation in the market, and although sellers have somewhat abated their pretensions and are now willing to deal at 7d. per lb., staplers are not buyers at that price. It does not seem probable that the price will rise above 7d. for some weeks to come, the large manufacturers in the north declaring that the price of manufactured goods is not high enough to remunerate them, unless they can buy the raw material at a moderate rate. Some few sales have been made at 6½d.

LIVERPOOL, Aug. 24.

SCOTCH.—There being now a fair quantity of the new clip to market, there have been a few sales of laid Highland at the quotations. White Highland is also in demand. There, however, continues to be very little doing in either crossed or Cheviot wool.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs....	8	6	10	6
White Highland do.....	11	0	12	0
Laid Crossed do., unwashed.....	9	6	11	0
Do. do., washed.....	10	6	12	6
Laid Cheviot do., unwashed.....	11	0	14	6
Do. do., washed.....	15	6	19	6
White Cheviot do... do.....	22	0	27	0

FOREIGN.—The attention of the trade is now attracted to the large series of sales now progressing in London. Our late arrivals have, however, met a ready sale, at full prices; and the reports from London are very satisfactory.

MANURES.

LONDON, AUGUST 26.

GUANO.—Nothing doing.

SUPERPHOSPHATE OF LIME.—A good demand still exists for Rape and late Turnips.

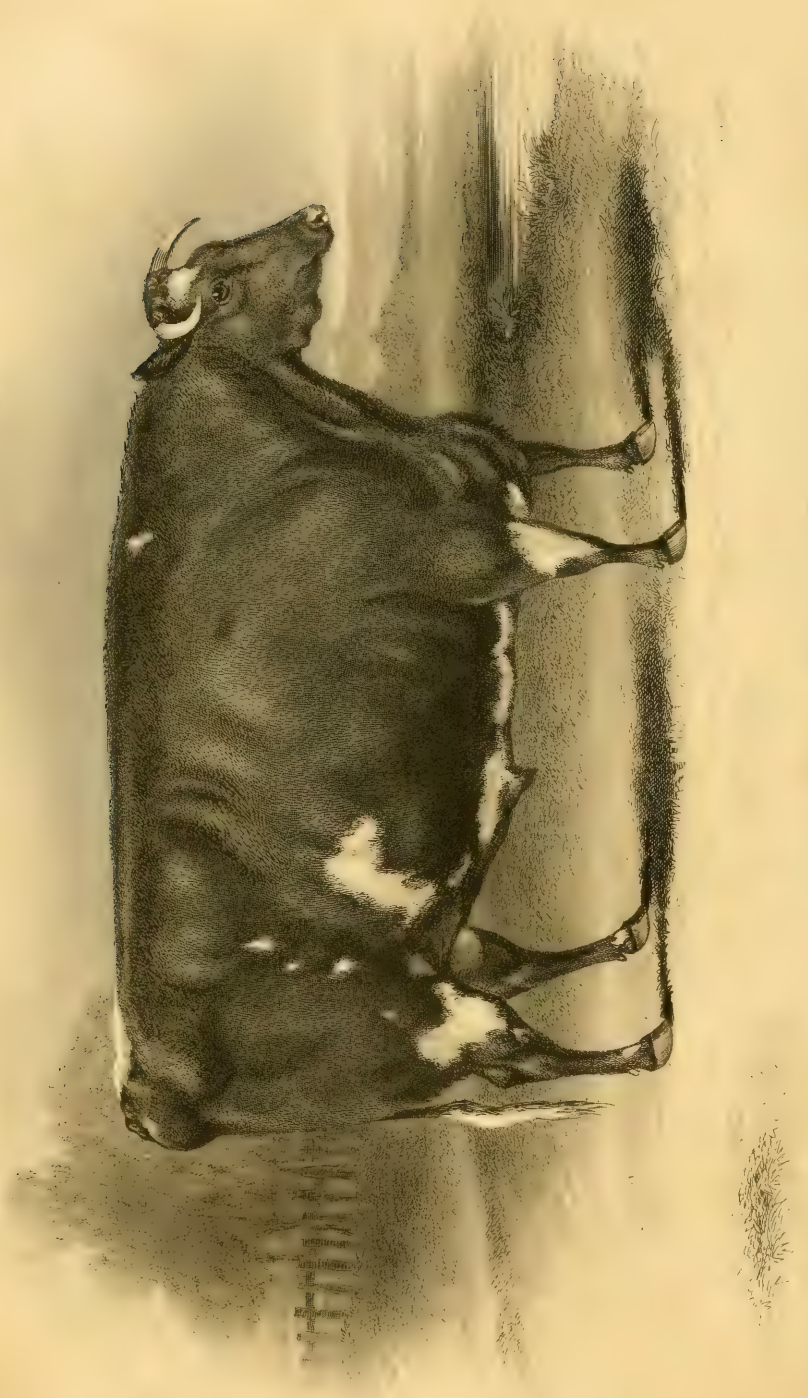
LINSEED CAKES are scarce, and command higher prices.

RAPECAKES are in good demand.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

Guano, Peruvian	per ton	£0	0	0	to	£9	5	0
" In quantities under 5 tons ..	"	0	0	0	to	9	10	0
Potter's Guano	"	0	0	0	to	7	0	0
Nitrate Soda	"	14	0	0	to	14	5	0
Nitrate Potash or Saltpetre	"	26	0	0	to	28	0	0
Superphosphate of Lime	"	0	0	0	to	6	6	0
Soda, Ash or Alkali	"	0	0	0	to	9	0	0
Gypsum	"	1	10	0	to	1	15	0
Coprolite	"	3	0	0	to	3	5	0
Sulphate of Copper, or Roman Vitriol for Wheat steeping....	"	27	0	0	to	29	0	0
Salt	"	0	0	0	to	1	5	0
Bones, ½ inch	per qr.	0	0	0	to	0	15	0
" Dust	"	0	0	0	to	0	17	0
Oil Vitriol, concentrated.....	per lb.	0	0	0	to	0	0	1
" Brown	"	0	0	0	to	0	0	3
Rape Cakes.....	per ton	4	0	0	to	4	5	0
Linseed Cakes—								
Thin American in barrels or bags ..	"	7	5	0	to	7	10	0
Thick ditto round.....	"	0	0	0	to	0	0	0
Marseilles	"	7	4	0	to	7	5	0
English	"	6	10	0	to	6	15	0

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THE FARMER'S MAGAZINE.

OCTOBER, 1850.

No. 4.—VOL. XXII.]

[SECOND SERIES.

PLATE I.

A SHORT-HORNED OX,

The property of the Marquis of Exeter, Burghley Park, near Stamford, for which the first prize of Thirty Sovereigns and Silver Medal were awarded in Class 2, at the Smithfield Club Cattle Show, December, 1849.

PLATE II.

THREE SOUTH-DOWN WETHERS,

Bred and fed by Mr. Samuel Webb, of Babraham, near Cambridge, which obtained the first prize of Twenty Sovereigns and the Gold and Silver Medals at the Smithfield Cattle Show, December, 1848.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. VI.

Before bringing the subject of the dairy and its auxiliaries to a close, it will be proper to allude to the goat as the best substitute for the cow, in every case where a family is desirous to have a regular supply of fresh milk and cream, without incurring the trouble which attaches to the ordinary processes of the dairy. It is not unadvisedly that I recommend the goat—not only upon the evidence of good authority, but inasmuch as I have actual example, as it were, before my eyes, in one of those cases where it would be inconvenient to keep two cows for want of sufficiency of land. Many persons have objected to the rank hircine odour of the male animal (which, however, is deemed far from objectionable by stable keepers); but this objection need not here apply, as the female and her kids can at all times be kept at a trifling expense, and a plentiful supply of milk obtained with little trouble. The animals are gentle, and in every way interesting. They, perhaps, are apt to stray abroad;

but with common prudence this propensity may be easily restrained.

The milk, esteemed the best and richest of a quality, as will soon be seen, is yielded in considerable quantity, and consequently throws up a fine cream. This milk has been in some places mixed with that of the cow; and thus a valuable cheese is produced. Mr. Pringle, of Kent, in an Essay on Cottage Management, stated that "two milch goats are equivalent to one small Shetland cow." When I resided on the borders of Somerset and Wilts, I had it certified that in a dairy of 13 or 14 cows, treated in the rude manner of the pasture farmers there, two to three quarts of milk per meal was the average of the yield from a fair-sized cow. If so, two good she-goats, chosen as they ought to be for having large udders and corresponding "spuns," with small or no horns, could certainly compete with the little Shetland cow. I quote, with a few abbreviations, the following apposite paragraph from Baxter's

OLD SERIES.]

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[No. 4.—VOL. XXXIII.

compendious Library of Agricultural Knowledge : "Goats are easily tamed, and will eat almost anything—feeding and browsing upon the branches of shrubs, lichens, briars, heaths, and plants of various kinds, which other animals will not touch. They are very active, and apt to wander; whence it may be proper to confine them, and to take care to keep them from damaging the trees of plantations. In flocks they are not so apt to straggle. Goats will require a place for shelter both in summer and winter, the variations of climate being very prejudicial to them. The usual time for coupling them is in December. The female is gravid four months and a-half, and brings forth from one to three young at a time. Cleanliness should be particularly attended to. The sheds must not be littered with straw, but require frequent washing to keep them perfectly clean. A paved floor is therefore preferable."

Several are kept about Croydon, some with their kids, to which they are solicitously kind and attentive. The milch goat is sometimes tethered by means of a light chain, which will give her ample space to move in a circle over mown grass, or in airy situations sufficiently remote from trees or shrubs.

A few more lines may be added without justly incurring the charge of irrelevance. The milk of the ass has long been in repute as a restorative. As to its superior medicinal qualities, some light may be thrown by a comparison of the components of various milks; but previously I would observe, that the ass is an animal which may be usefully and economically employed in the domestic homestead, not only as a labour power, but as a source of much available manure. The components of cow milk have already been stated: I now repeat them in the following table derived from the analyses of MM. Henri and Chevalier:—

MILK OF

	the goat.	the ass.	the cow.
Casein	40.2 ..	18.2 ..	44.8
Butter	33.2 ..	1.1 ..	31.3
Sugar of milk	52.8 ..	60.8 ..	47.7
Salts	5.8 ..	3.4 ..	6.0
Water	868.0 ..	916.5 ..	870.2
	1000.0	1000.0	1000.0

It appears from the above, that if any preference be due to asses' milk, as recommended for pulmonary patients, it may be ascribed to the comparative deficiency of curd and butter, and the predominance of sugar, and of what is styled the water; and here I would observe that we are liable to err in asserting that such and such qualities exist in ascertained proportions. Milk and other fluids, the products of vital organization, are specifically

vitalized in their nature, and do not, in fact, contain any given quantity of simple water. It is true that water can be extracted by a destructive chemical process; but the pale and light fluid which is obtained when milk curdles is whey or serum; and from this, water is never obtained by any natural process. From the table it will also be ascertained that the milk of the goat is richer in cream globules and in sugar (*i.e.* the sweet principle) than is that of the cow; and therefore it recommends itself more peculiarly to those whose means of pasturage, &c., are limited.

Next in value to the domestic homestead is the pig—an animal which is rarely absent from any cottage where there is a pole or two of cabbage ground; it also produces a great bulk of most powerful manure. We often find the breeding sow in such situations; but I am by no means desirous to introduce that animal in my domestic economics, having obtained proof that, although a breeder may be found considerably remunerative, a series of heavy losses are frequently sustained, to say nothing of the trouble and anxiety which must annually be induced. I never lost money by store pigs, raised as porkers, even when meal was nearly twice as expensive as it is at the present time. A store pig weighing, when alive, about 25lbs. to 30lbs., might cost at an average 28s. Every common garden yields a considerable bulk of refuse vegetable substances, and of such your pig is a general consumer.

People who *could grow* and yet *purchase* their green food ought to think of these things. The very potato-peelings, exterior leaves and stalks of cabbage-plants, &c., if only dusted over in the pig troughs with barley-meal, instead of rotting in the waste heap, or injuring the ashes of the bin, would be profitably consumed by the growing pig. My practice consisted in keeping the animal well supplied with plenty of *clean* straw in the inner part of a roomy sty that was securely roofed, wherein he could cover himself completely in cold weather; the outer half of the sty, open above, being furnished with an iron double trough—one half to contain the food, the other half water. *Wash*, as it is called, may do well enough for sows—though I doubt the fact—but the case is different when porkers are fed for killing, the dead weight of which, without offal, may average from three to four score. I have always found that pure barley-meal alone, or occasionally mixed with one-third its weight of pea-meal (not beans), and made into a thick mess, either with soft river-water or the waste skim-milk of the house, will bring a healthy pig into good condition in the shortest possible time. The season for fresh and pickled young pork is comprised between Michaelmas and the end

of March, after which it will not be safe to kill for pork; but time need not be lost, because a store pig or two may be fed with garden produce, always employing a little meal till the middle of August, when the system of full feeding with meal may be commenced, and persisted in till cool weather and the condition of the animal shall indicate the exact time to kill for small bacon and hams, to weigh about 9lbs. or 10lbs. each. I say this experimentally, and shall conclude the article with the following short extract:

"The time which is required for fattening varies

according to the size, description, and condition the pig is in when shut-up. Weanings are generally fatted in a very short period for delicate pork. A pig of five or six months old will, if in good condition, generally fatten in eight or ten weeks. Small hogs, for bacon, will be ready in twelve weeks, and the larger from 16 to 20 weeks. They should, during these periods, be fed regularly, giving them sufficient, so as perfectly to satisfy them, at the same time not allowing any of the food to be wasted, or left in the feeding-trough, and care taken that they always have clean and fresh water."

THE POWER OF SOILS TO ABSORB MANURE.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

Under this title a very valuable paper, by Professor Way, has recently appeared (*Jour. R. A. S.*, vol. xi., p. 313). It contains the results of various important researches, on the effects of uniting decomposing organic substances with the soil. These experiments serve to illustrate many operations in rural life with which we have been long conversant, but which have not always been correctly understood. The practice of all ages in burying decaying animal substances, shows that mankind were very early used to protect themselves from the effluvia arising from decomposing organic matters, by covering them with earth. They well knew the effect, but the cause was not much considered. Even the North American Indians are aware of the action of earth in absorbing the noxious emanations of animal matters, for it seems that when they take a skunk (a species of polecat), which has an intolerable smell, in order to sweeten and render it fit for food, they skin it, and bury the carcase in the soil, where it speedily loses its offensiveness. We are all aware that venison is sweetened in the same way. Even animals follow a similar course—the fox buries his game—the dog covers with earth his food.

We have all been too apt to regard these coverings of earth as merely useful in concealing from our senses what would be otherwise disgusting. It has not always been suspected that by this covering of the decomposing organic matters the gases produced were absorbed by the soil, and stored up for the use of a succeeding crop of growing plants. Even when the farmer covers his dung-heaps with soil, the common-sense conclusion is that the operation retards the too rapid progress of the fermentation, and shelters the dung from the injurious influence of the sun and wind. That the clay or loam with which it was covered, or the soil on which

it rested, had the power of absorbing the ammonia or other matters escaping from the fermenting heap, was hardly commonly suspected. The result then of the trials of Professor Way have tended to clear up much that was indistinct on these heads, and in relation to absorption of manure by the soil; and in thus referring the farmer to his paper, it would be unjust not to also direct his attention to another valuable essay on the same important subject by Mr. H. S. Thompson (*ibid*, p. 68), who, in fact, was an earlier traveller in the same path than the professor. Mr. Huxtable also directed Mr. Way's attention to the inquiry; he told him that he had made an experiment in the filtration of the liquid manure in his tanks, through a bed of an ordinary loamy soil, and that after its passage through the filter bed, the urine was found to be deprived of colour and smell—in fact that it went in manure and came out water. This of itself was a singular and interesting observation, implying as it did the power of the soil to separate from solution those organic substances which give colour and offensive smell to putrid animal liquids. "About the same time," continues the professor, "Mr. Thompson mentioned to me that he had found that soils have the faculty of separating ammonia from its solution; a fact appearing still more extraordinary, inasmuch as there is no ordinary form of combination by which we could conceive ammonia to become combined in a state of insolubility with the soil. At the time I was not aware, as I have since learnt, that Mr. Thompson had fully three years ago occupied himself with a series of experiments on the subject, and with the assistance of Mr. Spence, of York, had arrived at results which left no doubt in his mind that soils possess a specific power for the detention not only of ammonia, but of the salts of ammonia."

These results then not only tend to enlighten our onward path, but they serve to indicate other roads to the acquisition of agricultural knowledge. From such facts will probably arise useful practical results, such as those which have attended the use of peat charcoal, for, as I had occasion to remark in another place (*Bell's Messenger*), it has long been known to the preparers of artificial manures, that the very impure charcoal produced by charring the clayey mud of the Thames, when mixed with night-soil, produces the same deodorising effect; its noxious matters are absorbed—the mixture becomes devoid of smell and harmless. This was naturally attributed to the presence of the considerable proportion of charcoal which this charred mud contains. Its other chemical ingredients were disregarded. It is certain that the proportion of various gases absorbed by newly prepared charcoal is very large, and this action seems, according to the trials of M. Saussure, to be analogous to the capillary attraction of liquids by very small tubes. It is worthy of notice, when we are thus considering the power of the charcoal, that of all the gases tried by this celebrated chemist, ammoniacal gas was absorbed by charcoal in the largest proportion. Thus, supposing the volume or bulk of the charcoal to be equal to 1, the various gases were absorbed in equal volumes or bulks equal to the figures set against their names (*Thomson's System*, vol. i., p. 227):—

Ammoniacal gas	90
Sulphuretted hydrogen	55
Carbonic acid	35
Carbonic oxide.....	1.75
Hydrogen.....	9.42

The absorption of gases by newly-made charcoal seems to terminate at the end of twenty-four hours; but then it appears that if charcoal already saturated with any gas is put into another gas, it gives out a portion of the gas already absorbed, and absorbs a portion of the new gas. The effect of different soils in retarding the progress of decomposition has lately engaged the attention of the General Board of Health, and these distasteful researches have shown that the progress of decay varies considerably in different soils and situations, and that as a general rule, putrefaction goes on the most rapidly in light dry soils (that is, in those where alumina or clay is in the smallest proportions), and also where the roots of growing plants exert the most considerable influence. The commissioners, in a recent valuable report on a general scheme for extramural sepulture, p. 117, remark—"From the concurrent testimony of grave-diggers, sextons, and others employed in church-yards, it appears that decomposition invariably goes on more rapidly near the roots of trees than in any other parts of the burial-ground

—that the earth is always much drier near the roots of trees than elsewhere." The good effect upon plants of this recently discovered power of alumina to absorb noxious emanations is illustrated by the remarks of Mr. E. Lucas on the action of charcoal powder, as observed in the trials made with it in the Botanic Garden of Munich (*Liebig's Org. Chem.*, p. 210), the excellent result of whose absorbent powers he attributes, amongst other things, to its preserving the parts of the plants with which it is in contact, whether they be roots, branches, leaves, or pieces of leaves, unchanged in their vital power for a considerable period, so that the plant obtains time to develop the organs which are necessary for its further support and propagation—thus keeping the soil free from the putrefying substances which are often the cause of the death of the *spongiolæ*.

It is, then, most fortunate for the productiveness of the soil, that any portion should possess the power of absorbing and storing up, as it were, these disease-engendering emanations, which, without this beneficent provision of its Divine Author, would render even the burying of decaying substances no remedy for their offensive and noxious effects. It offers, too, for the practical farmer, another reason why all organic manures should be ploughed into the soil as speedily after they are spread over the surface as possible—that the alumina of the soil may thus be enabled to absorb and store up in the soil for future crops, what otherwise would contaminate the atmosphere, lessen the amount of the riches of the farm, and thus, instead of producing food, cause disease and misery. The trials of Professor Way, to which I have alluded, were made upon the fluid of the London sewers, and the even more noxious liquid produced in the steeping of flax. These important experiments were repeated before the Council of the Royal Agricultural Society of England. On this occasion he placed on the lecture table some glass filters containing a red soil, from the estate of Mr. Pusey, in Berkshire. This soil filled the jar to the extent of five or six inches. Upon one of these the lecturer poured some of the London sewer water; to another he added the fœtid flax water. Both of these liquids were turbid—both highly coloured and equally offensive to the smell. As soon as they were passed through the soil, however, and began to drop from the jar, the auditors noticed that a remarkable change had taken place; the liquid had now only an earthy smell—such as that which commonly attends the water from soils—but the fœtid smell had disappeared. It then became an interesting question to ascertain to what portion of the soil this change was to be attributed. Was it the sand of the soil, or its clayey portion, that was the cause of this rapid purification? The course taken by the

Professor pretty clearly decides that it is to the clay that we must attribute this important alteration. Thus some putrid cow's urine, passed through a filter of fine sand, had its mechanically suspended matters removed, it is true, but its fetid smell remained; but when another portion of the same putrid urine was passed through a mixture of the white sand mixed with one-fourth of its weight of white clay in powder, the result was now very different—not only the colouring matters, but the smell of the putrid urine had disappeared. And still further to insure accuracy in the inquiry, another mode was adopted; instead of using the mixed sand and clay as a filter, some of the same mixed earths were added to some of the putrid urine, and after being well mixed by stirring, allowed to subside; the fluid, when this was done, became equally clear, and equally free from smell. These fœtid exhalations from such impure decomposing fluids are chiefly composed of various gases, in which ammoniacal gas, carburetted hydrogen, sulphuretted hydrogen, carbonic acid gas, &c., abound. Now of all these emanations, the most valuable to the farmer, and therefore the portion the most desirable to retain, are the salts of ammonia. It is a happy circumstance, therefore, in the economy of nature, that clay has the power of absorbing ammonia from the water in which it is deposited. The Professor found that the clay of a soil has the power of not only absorbing ammonia, but the alkalies, potash, soda, magnesia, &c. If a quantity of ammonia, highly pungent to the smell, was thrown upon a filter of clay or soil, made permeable by sand, the water first coming away was absolutely free from ammonia. Such was the case also with the caustic or carbonated alkalies, potash, or soda. This very wonderful property of soils appeared to him as an express provision of their Creator. A power, he remarked, is here found to reside in soils, by virtue of which not only is rain unable to wash out of them those soluble ingredients forming a necessary condition of vegetation, but even those compounds, when introduced artificially by manure, are laid hold of and fixed in the soil, to the absolute preclusion of any loss either by rain or evaporation.

And again, as might have been reasonably anticipated, the same results were shown to occur when, instead of adding the ammonia to the soil in a state

of solution, it was produced in the soil by the decompositions of one of its salts. This, it may be well to remember, is the real explanation; for it would be a great mistake to conclude that the clay of the soil has the power of decomposing the sulphate or muriate of ammonia, which were employed in the experiments of Professor Way. For instance, he found that sulphate of ammonia, when filtered through a soil, left its ammonia behind; but the sulphuric acid was found in the filtered liquid—not, however, in the free state, but combined with lime; thus sulphate of lime was produced, and brought away in the water. In the same way muriate of ammonia left its ammonia with the soil, its acids coming through in combination with lime, as muriate of that base. The same was true of all the salts of the different alkalies, so far as he had yet tried them. Thus lime in the economy of nature was destined to one other great office besides those which had already been found for it—it was the means by which the salts ministering to vegetation became localised and distributed through the soil, and retained there until they were required for vegetation.

The extent of this power, Mr. Way found, was about equal to two grains of ammonia to every 1000 grains of a loamy soil—an extent of power more than equal to anything that the farmer is likely to require of it. The weight of a soil ten inches deep being equal to about 1000 tons, that weight of earth would absorb about two tons of ammonia, a weight far beyond any probable extent of application of this valuable fertiliser.

Such are the interesting facts ascertained by the laborious research on which we have been thus dwelling. If there is comfort in being made aware of the real nature of some of the endless processes which abound around our paths, if there is profit in being thus shielded from delusive experiments and profitless trials, how well assured may we be of the extent of these advantages in the investigations on which we have been dwelling! They will afford to us all, too, still farther assurances of Divine benevolence, when we reflect how the property of producing noxious vapours and pestilential emanations, by decomposing organic matters, is counteracted by other powers imparted to earthy substances of absorbing and retaining them in the cultivated earth.

DRAINING STRONG CLAYS.

BY M. M. M.

This may very properly be said to be one of the vexed questions of agriculture, and one where a great deal of personal acrimony and bitterness have

been mixed up with matters of purely scientific import, in such a way as to be disgraceful to the parties who have taken up one or other of the sides of

the question. It might seem surprising that after a very long period of attention to clay land, owing to its being the popular class of soils growing wheat and beans in favour from the period of the remotest history of farming, we should still be learning the best mode of draining it, and disputing the very first principles of the art. But there are reasons why this may be as yet an unsettled question.

A clay soil or a strong loam may very easily be, owing to good management, frequent green cropping, good manuring, or from the fact of being very recently taken out of grass, in a friable and porous condition: whereas, another may be, by long and tedious cropping, tiresome and incessant working, and by little manure being returned, reduced into a state of tenacity and adhesiveness which will require a system of drainage as different from the previous case as possible; and as it is the latter class of soils which have been so long neglected and so far gone in that peculiar property called provincially "waxings," the difficulty arises at the very threshold of the present description of clay drainage; and the anxious inquiry is, how frequent, how deep, and in what manner shall we drain? There will always be modifying circumstances to guide, in some degree, to the settlement of these questions. The fall will in some instances interfere most seriously with the depth; and this, again, with the frequency of the drains for it, may be held as a rule too general and proved to admit of a shadow of doubt, that the frequency of the drains will increase in an inverse ratio to their diminution of depth. Then the material will also vary with the locality to a considerable extent, though as a general rule it may be safely laid down, that where you have a strong tenacious clay you have also a soil capable and fitted for the making of tiles; and as the quantity of tiles, and hence the cost and labour of cartage, are items so serious in all clay land drainage, it is always economical, where the land is of any considerable extent, to erect a tile shed in the most central and convenient part of the estate, and thus much may be saved in transit, as well as economized in the original cost of the article. We speak of tiles, because though other materials have been used in some districts, and used, we are willing to admit, most successfully, it cannot be disputed for one moment that tiles are by very far the best kind of drainage material; and it is only a state of things involving difficulties, which on clay soils we can scarcely contemplate, that should prevent the use of tiles for drainage.

Before, however, the materials for drainage are considered, it may not be uninteresting to glance at the objects to be served by the drainage of clay soils, rather to assist the inquiry generally, than

from any doubt as to the value or necessity of such a process.

If we consider for a moment the state of a wet undrained cold clay, we shall find it generally pressed from below by land springs at a greater or less depth from the surface, and which are struggling for egress to the surface with all the power which hydrostatic pressure can give them, acted upon by that of the atmosphere and superincumbent strata above, but more especially as they suffer from the effects of the rain which falls from above. Having lost their porosity, they become highly retentive of moisture, and evaporation has to do what porosity below cannot effect; and hence the surface becomes saturated with water, so as to resemble, more than anything else, the puddle made by engineers to arrest the progress of filtration of water. Now, it only needs the treading of the feet of cattle or horses in this state, to make a surface hold water like a pot; and if it unhappily happens that a wet season precedes the seed time, the sowing must either be deferred, or the poaching and injury of the soil are inevitable. In undrained soils it is common to pay great attention, after sowing, to the gripping or water-furrowing of the land; in other words, the cutting of open drains near the surface, to get the stagnant water off the surface of the "lands," into which the soil is invariably ploughed, to prevent it utterly destroying the corn; and all this at the expense of anything which might be calculated to grow in the furrows. Hence the unevenness of crops of corn on undrained clay land, and the saving by proper and judicious under-draining of the surface of the land. It must be obvious that no gripping nor water-furrowing, however, can be available during the washing of the fallows; and hence the soil is all the winter subject to the damaging influence of the stagnant water to which it is exposed. What that damage is we will for a moment stop to inquire. The first and greatest by far is *evaporation* and its effects. This is but a recently investigated subject, and not a small degree of ignorance has been evinced in treating this subject. We seem to know more about the subject from the researches and observations of a very scientific man—we mean Mr. Charles Charnock of Holmfild, near Ferrybridge, and late of Stanton Lodge, near Leeds, than by all the observations of scientific men besides. The details are given in the *Royal Agricultural Society's Journal*. The plan adopted was to represent, as closely as possible, the natural soil. A vessel of lead was provided, one foot square and three feet deep. To resemble as nearly as possible the kind of soil Mr. C. cultivated, two feet of the bottom of this vessel was filled with gravel and calcareous sand, and the remainder was filled up with soil similar to the general average of the farm to

within an inch of the surface. At the bottom of this vessel a pipe was inserted to take away the water which filtered through the soil and gravel, and the box was then plunged in the ordinary soil. This was the filtering process. A similar vessel was also filled in the same manner but 13 inches deep, with a pipe, level with the surface of the soil, to carry off the excess of water into a receiver; and the evaporated water was daily supplied to this soil. The results are given for five years, but we will take only two for our present purpose—not divided into months as Mr. Charnock divides it, but in the aggregate. The following are the results:—

	1842.		1846.
Rain fell.....	26.11	....	25.24 inches.
Filtered through the soil.....	4.55	....	6.76 do.
Evaporated from drained soil	21.56	....	18.38 do.
Evaporated from saturated soil....	30.02	....	33.28 do.
Evaporated from water exposed to sun and wind....	33.61	....	34.69 do.

Now, if a saturated soil will evaporate as much water in a season within a very small percentage as will be evaporated from water itself, it must be clear that the soil will always be in a state so cold as to render the growth of the more delicate grasses and better order of plants, especially of exotic origin, a matter of difficulty if not of impossibility. And when water is present in excess, of course oxygen is so far excluded—we mean not entirely, but as each particle of water will necessarily exclude its particle of oxygen, and as that gas is not only necessary to the full development of all the vital processes of plants, but also to the decomposition and disintegration of the organic and inorganic materials of the soil. In the same way the worst effects are produced on the germination of the seed by being deposited in some seasons in undrained clay. For want of oxygen and from excess of water, the seeds will often decay and be lost. Very ample illustrations of this may be seen in Dr. Madden's paper, printed some years ago by the Highland and Agricultural Society of Scotland. Nor are the effects on the climate less important or less valuable than those on the soil. Evaporation will produce a humid atmosphere, unhealthy to plants, and injurious to their growth, producing mildew or rust, or making their development short or stunted. Nor will this loss of humidity operate injuriously on plants usually cultivated in a dry season. In nearly all circumstances, sufficient moisture will be retained in the soil and in the atmosphere to supply the necessary quantity for their use; and in a dry season, the effects of drought will be much less felt by the plants in a dry soil, which are healthy and

vigorous, than they can be on a cold undrained one where they are necessarily poor and stunted. For the roots of plants to have free access to the soil requires a freedom from more moisture than is held by capillary attraction; and if there be any excess they will be short and stunted, and subject to disease. But, perhaps, the most beneficial effects of drainage are felt when the manure is applied. If there be stagnant water in the soil, the evil of bad drainage in the farmstead is only transferred to the field; and we have the best particles of manure—the parts most useful and most soluble—dribbling away down the ditches. It cannot be expected that drainage can altogether obviate this; but there will be this difference between drained and undrained land, viz., that the latter will admit of the water washing the soluble parts of the manure through a filter, which will fix and retain its most valuable particles. Experiments have been made on the water issuing from drains on recently manured land, especially after a thunder shower; and a manifest change in the character of the drain water was evident: but how much more so, if instead of the water passing rapidly through the manure, and filtered in the soil, it had been allowed to be soaked for hours, nay, for days in stagnant and evaporating water!

We will enumerate only one more result of the thorough drainage of clay lands—it is, the diminished labour resulting from a well understood and thorough drainage of the land. If saturation and excess of water produces a hard, impervious, tenacious soil—if it increases the danger of the pressure of the horses' feet in summer, and if it moreover, accelerates the growth of semi-aquatic grasses, it is difficult to conceive how much the labour of clearing and of working is obviated by a system of efficient and thorough drainage.

Attempts have been made to make the clay its own conductor, and by means of a mole-plough carrying off the water below the surface. This was drawn either by horses attached to the mole-plough itself, or by means of a windlass, which was a more perfect mode. The drains were run up every furrow; and where the field was nicely undulating, and with a regular and gradual descent, we have seen the greatest benefit accrue, especially to grass land, by the process. The operations of the roots of the grasses growing and decaying, and spreading out their multitudinous filaments, have a strong tendency to make the soil friable, at least so far as they extend. Thus we find a field newly taken out of grass invariably more workable than an old-going tillage field of the same quality; and hence it is well understood, that, other things being equal, a grass field has less necessity for being drained than an arable field. Now, the mole-plough, by taking

away immediately the surplus water, without interfering with the general arrangement and disposition of the soil or subsoil, may be of great service under certain circumstances. Not that it will either produce any radical change in very wet land, nor do any very efficient service where drainage of a thorough description is required; but it will much improve land suffering from a deficient power to absorb the surface water. Mole-plough drains are only for the purpose of rapidly taking off excess of surface water, and on grass land, because the mole so compresses the sides and bottom of the drain it leaves, that it is quite impossible for any great percolation of the water to take place through them; while the slight fissure at the top is all that is depended upon for the ingress of the water to the drain. Some idea of the operation may be formed from the little accompanying sketch of the mole-plough, fig. 1, and of a section of the land through which it has passed, fig. 2. It may be mentioned as an instructive fact, that when the Hartlepool extension of the Leeds and Thirsk Railway made a cutting in a field of the late Mr. Bates of Kirkleavington, the mole-plough drains, which had been cut more than thirty years, were in full operation; and the sections of them were as perfect as when first cut, as well as the water running perfectly clear.

Allied to mole draining is that of sod or turf draining, as it is called, which may be performed on grass land where the soil is of a tenacious nature. This is performed by simply cutting out a wedge-shaped sod or piece of turf from the furrow, or place where the drain is intended to be cut; then cut off the point of the wedge, and again insert the sod. The section of this drain will resemble fig. 3. These systems, however, are very imperfect on all arable land, and even on grass land are very liable to injury by the treading of the feet of cattle, carting, and injuries of a similar nature.

One of the most ancient modes of underdraining was by twigs or hollow tubes of wood; and this is not yet altogether abandoned. There are soils so strong and adhesive, that if a series of faggots of wood be judiciously placed in the drain, and carefully covered up, a very useful temporary drain is made, which is of considerable service in aiding the escape of the surface water on very strong soils. In Essex the plan is still prevalent; and Mr. Baker, in his interesting report on Essex farming, gives it in a very intelligible and interesting way. These drains are formed by the plough in the first instance, which forms a drain diagonally of the field required to be drained, selecting the inclination most favourable for outfall; and these are cut five to seven yards apart. A stronger plough follows to deepen the drain, which passes once or twice, as may be necessary, until a depth of six to eight inches is

secured. The spade next follows, making the main drain, which is about 22 inches deep; while the subsidiary drains vary from 20 inches below the ploughing; so that an uniform depth, say of 30 inches, is secured. Thorns and straw, or straw alone, are then inserted in the drains. In the latter case, the straw is twisted into ropes; in the former, the thorns are partially cut with the axe, to make them bed solid; the pieces of them or wood are placed in a leaning position, and the smallest put towards the bottom. The last piece always overlaps the former, and they are laid so as to form no obstruction to the water. A diagram, fig. 4, from Mr. Baker, will give an idea of their position.

We cannot help alluding to the mode of stone draining, because it prevails to a small extent in some parts of the kingdom; and where stones are very plentiful and near the spot, it is sometimes an inducement to use them; and thus economize the first cost of drainage. The indiscriminate filling-in of broken stones, without regard to the shape or size, is a very objectionable mode; but the readiest and most efficient plan is to make use of the oolite brash, where there are flat laminated stones, sufficient to form the sides and bottom of the waterway; and a variety of shapes are given to the drain, but chiefly triangular or square. Sometimes the triangle is inverted, with its base uppermost; and this the late Mr. Smith, of Deanston, recommended most in his early works on the subject. For stiff clay, his advice was, a distance between the drains of 13 feet—2½ feet deep; and the total cost per acre he made out to be £7 6s. 3d. Dividing for equity sake the proportions, the landlord ought to pay out £4 17s. 6d., and the tenant £2 8s. 9d. On nearly all strong clays, however, the tile has made every other mode give way before it; and, perhaps, a more complete and perfect system cannot be conceived than the improved system of tile drainage now in operation. Every point is not yet settled as to whether the pipe tile, or the horse-shoe, or some other of the endless mathematical figures into which sections of drain tiles are now manufactured, is the best; but all agree that whether as to security, porosity, facility of flow, or almost any other recommendation, there is nothing equal to the tile. Still the controversy is hardly settled as to whether the horse-shoe tile, or the pipe, is the kind most adapted to general use. Much may be said on both sides; and though there may be strong reasons in favour of the horse-shoe tile, there are also, it must be admitted, others equally cogent in favour of the pipe. Perhaps, however, the strongest of all reasons was, that the pipe tile could be manufactured at a very much smaller cost than the common horse-shoe form, and was at first considered as specially adapted to machine work, and hence con-

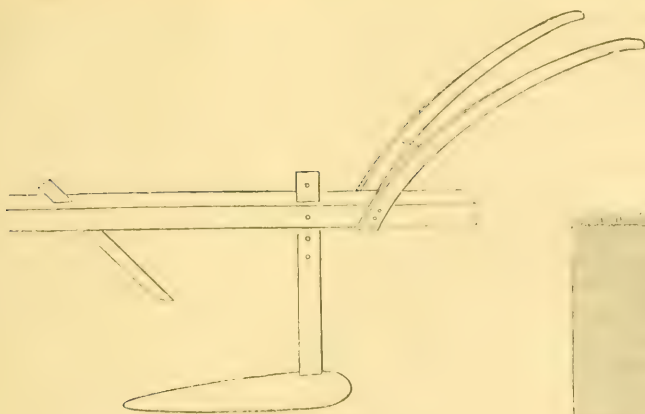


FIG. 1.

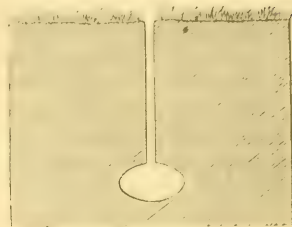


FIG. 2.

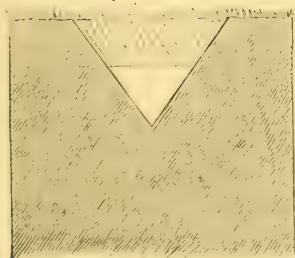


FIG. 3.

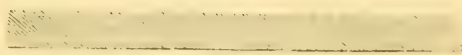


FIG. 4.



FIG. 5.



FIG. 6.

sidered more accurate in its construction, and better calculated to fit. The clay, the space it occupied, the cost of burning, and the cost of cartage, were all. This element of cost, however, has had the tendency to induce some parties to use some tiles of too small a bore; and a one-inch in diameter tile was by no means uncommon, at least in the early days of drainage. Another advantage of pipes was, doubtless, the security they afforded from moles, mice, &c., in the soil; for if properly placed they prevented their access entirely; and many of the objections at first raised against pipe tiles have been either over-ruled or obviated. So far did Mr. Parkes carry his theory in the exclusive favour of pipe tiles, that he declared "the cylinder tile of an inch bore formed the best known conduit for the parallel drains in clay soils; but for a run of not more than 300 yards" (evidence before the House of Lords.) Much fear was at one time entertained that there was a difficulty in the water obtaining access to pipe tiles; but this was very readily answered by the double fact that the fissures between the tiles were quite sufficient to convey water enough

to fill the drain, and that even when those were covered by collars there was porosity enough in the tiles themselves to admit of the necessary percolation of the water. By far the most serious objection to pipe tiles, especially of small bore, was their tendency to cant sideways; for as they rest upon a *point* it must be clear that a very little lateral pressure would so far displace them as to interfere with, if not totally stop, a cavity of only one inch in diameter. This is confessed to be a great difficulty, and the remedy generally recommended is, that the most careful cutting of the drains should be insured to prevent the possibility of this. But there are few workmen, however expert, or with instruments however true and accurate, who can cut a fissure or bed to half an inch; and yet this may really make all the difference, and do inseparable mischief to the whole system of drainage.

Mr. Parkes, in the evidence quoted above, admits that "pipe-tiles must be laid at the bottom of a trench formed *exactly of their own size*, so that they cannot stir right or left." Mr. Hewitt Davis in the same committee stated that the pipes must

be accurately embedded in the bottom of the drain so as to be *unable to move*, or the ends to shift from each other." Mr. W. Hutley also acknowledges that he has to be "very careful that the bed in which the pipe is placed should be *no broader than the width of the pipe itself*." Mr. Robert Ellcott, of Hardgrave, near Ecclefechan, in his Prize Essay on Drainage, a very warm advocate of pipe tiles, says: "I am convinced from all my experience that they are equally effective, equally permanent, and less expensive, being also more easily managed, taking less cartage, and causing less trouble in laying: only, when pipe-tiles are used it is advisable to cut the drain narrow at the bottom *as near the size of the pipe as possible, to prevent their moving*." There are two modes of remedying the difficulty, which the greatest advocates of pipe tiles are compelled to admit, viz., the tendency to roll out of their places; the one is by increasing the bore of the tile so as to render a slight movement of less consequence to the permanency of the drain; and the other is by flattening the bottom of the pipe so as to allow it to rest on a foot, as in fig. 5. The latter kind of tile was invented by the Earl of Tyrconnell, who finding their tendency to cant, from pipes being always resting on a point, added the sole, which of course keeps them in a right position, and neither increases much the labour, fixing, carting, nor cost of the tile. Perhaps the very best form of pipe is the one internally circular and externally square—both for durability and facility of laying; and we have the highest possible opinion of the one sketched in fig. 6, as answering all the purposes of the best kinds of tile; only, let it have sufficient capacity. The advocates of very small bores, driven to find some reason for their recommendation beyond the one of cost, the element they always estimate so highly, offer this somewhat questionable reason—"that they compress the water into the smallest possible volume, and by always running full bore prevent the accumulation of deposit." This reason is well met by Mr. C. L. Williams, acting engineer to the Severn Commission, who says—"The fallacy of such reasoning is apparent from the fact that the supply of drainage water is never constant, but varies with the season; and consequently a small pipe which would discharge itself full bore in a dry season, would be totally inadequate to carry the water from the land in a wet season: on the other hand, if the maximum discharge is to regulate the diameter, it is equally clear that in dry seasons the pipe cannot always be running full bore." The horse-shoe sole and flat are known to be effectual; so are the pipes if carefully laid, and of sufficient capacity; and we think $1\frac{1}{2}$ to 2 inches the very least diameter which should be admitted in any kind of draining; for it is a less

evil to have a spare space in the drains, than to have them inadequate to carry off the water.

The depth of drains is, after all, the great bone of contention; in reference, we mean, to the land of which we are treating—the cold, wet clays. Smith, of Deanston, was the deep drainer of his day, and he insisted on a system of 30-inch drainage. He repudiated all variations and modifications whatever, and fearlessly asserted that to have any useful system of drainage it must be on one uniform principle. As the deep drainer of his day, he went below the mass, and his battles were with the 20 and 24 inch drainers of clay; but Mr. Parkes, taking a four feet depth, and asserting it to be the only legitimate depth, somewhat outwent Mr. Smith's arguments; and the exhibition of the two champions, at Newcastle, at the meeting of the Royal Agricultural Society there, was one painful to men of science, while it showed how prejudices could warp the clearest judgments, and how well Lord Portman struck out the line of truth when he said, "that no one uniform depth would answer equally for all localities."

Drainage has to effect two objects: first, to tap any land-springs which may be forcing themselves upwards from the subsoil; and the other, to admit the free passage of clear surface-water through the soil downwards. The principle is this: You cannot make, in a compact bed of clay, an open fissure and keep it open, but the water will find its way, drop by drop, into the fissure; the air will also dry the adjoining particles of clay, and so the water above will follow, particle by particle, partially forced by the pressure of the atmosphere, partly by gravitation, and partly by capillary attraction. Now, as this water is abstracted, the clay will become contracted; every particle of water lost will leave a particle of air; and, the bulk being diminished, the whole mass will become a system of cracks and fissures. Down these the water will rapidly filter; when it falls, the air within will be displaced, and the whole falling into the fissure below will repeat the same process. It may be urged that, if this reasoning be universally good, there is no limit to the depth of drains in any soil—for the reasoning which would hold good for a depth of 30 inches, or a depth of four feet, would also hold good for seven. But there is a limit—there is a bound, and "hitherto shalt thou go, and no further;" and the modifying circumstances of the soil alone, in our opinion, will have to be the pivot on which all practice must turn; and it must be admitted, by the very deepest drainers, that there is a depth at which it is unwise in some soils to go, even if it were practicable.

Mr. Thomas Spencer, Wrotham, Kent, began, as he states in his evidence before the House of

Lords, with draining 20 to 24 inches deep, and increased it to 48 inches. He states that, "the deep drains will always run first and longest, and run most water. The deep drains were running, and the shallow drains were dry." He drained all his land over again which he had drained shallow, and it was certain it would produce one-third more corn with deep than with shallow drains.

Mr. Pusey, before the same committee, gives his own experience very forcibly on the same point. He stated, that he drained his coldest and stiffest clays with inch pipes, 3 to 4 feet deep, and put the clay on the top. At first he considered this to be wrong; but experience, he stated, showed him that, at 34 inches deep, inch-pipe drain-tiles, 30 feet apart, dried the stiff clay effectually. He was first convinced by observing the fissures in a clay pit going down about 4 feet. In a wet summer, next after draining, these fissures may close; but drought will open them, and they remain open, and the draining prevents their collapsing again.

Mr. S. Thompson, of Reigate, Surrey, before the same committee—Commenced with 30 inch drains; but, from great experience, he became convinced that deep draining was best, so far as the depth which land-crack water will go down. Some of his drains in clay he makes 6 feet, but commonly 4 or 5 feet in clays that will crack. The advantage of going down so deep is, that it drains water from a greater distance, and filters it through a greater depth of soil.

Mr. Parkes, before the same committee, then explains the *rationale* of deep draining in clay. "Deep drains work by means of the fissures caused by cracks in the soil, consequent on drought, in the *closest* and *most tenacious* clays. These cracks do not occur in moist clays till after drainage, and then, not only large chasms or openings occur in drought, leaving the masses between solid and entire, but smaller and more numerous fissures also take place, by which the air is made to pervade the interior of the soil; and from the absorption of this air by the soil a certain degree of moisture arises, which is highly beneficial to vegetation."

But we think the safest mode of all is to secure two points, which, if fairly attained, place the whole matter of drainage in a position of certainty. These are, first, to place the drains sufficiently near the surface to secure the rapid discharge of the water above them, the land laid flat, and the whole of the water which falls from above descending in the exact spot where it falls, and to obviate at all times the presence of water standing on the surface, as well as to prevent the soil ever being so wet as

to be liable to be poached with the feet of the horses. If this be accomplished, the drainage is at the proper depth, and the land is, as regards drainage, what is technically called "cured."

The above remarks apply to surface water alone; as regards the forcing upwards of land-springs sometimes deep in the earth, and pressed upwards by the accumulation of a vast amount of rock or earth, a different rule will apply; and, indeed, so distinct are the two cases, that some very excellent improvers have treated the two as quite distinct operations. Mr. Parkinson, of Leyfields, near Newark, whose farm is as near a model as any we ever saw, adopted this mode many years ago. He found a red loamy clay suffering, both owing to the impermeability of its structure from top water, and also from the presence of deep lying land-springs; and having abundance of fall, he first adopted a system of drains four to six feet deep, to tap the springs; and then, quite irrespective of these, he drained the surface at 24 inches, if we mistake not, speaking from memory; and we must acknowledge that he effected a complete and permanent cure. How far these very deep drains might do more than tap the springs, or whatever effect the two modes might have, we pretend not to say beyond the fact that the drainage is perfect.

We remember an instance we once witnessed in Yorkshire, where a clay field was drained at 24 inches across the ridges, and at some seven feet apart. The field was certainly improved, but it was still wet and untractable. The spirited owner determined to begin *de novo*. He took up the whole of the tiles, cut to 32 inches, and then formed in the clay a thin stratum of yellow sill, in which a spring was running, and the water from which had been forced into the active soil, notwithstanding the drains, and effected the injury. Now, however, the deeper drainage tapped this spring, and a thorough and effectual remedy it was. We cannot sum up the principles of drainage, as to its depth, better than by quoting the axiom laid down by Mr. Buney, in the *Journal of Agriculture*, in a masterly article on drainage. He thus describes it:—"The depths at which drains ought to be placed in the soil are directly as the effects to be produced by art and the influence of the sun." And "the purification of the soil will be inversely as the times during which water is filtered through the greatest number and length of percolating tubes to the drain, but directly as the quantity of water discharged from the drains in a given time, other things being equal."

Sowerby, *Thirsk*, Aug. 19, 1850.

ON WINTER-FEEDING OF SHEEP.

BY CAPT. THE HON. DUDLEY PELHAM, R.N. M.P.

To Mr. Pusey.

MY DEAR PUSEY,—Having for four years been paying some attention to the practice of home or shed-feeding of sheep, I am disposed to think it is a subject which has not yet been sufficiently considered by farmers, and that benefit may result from their attention being drawn to the practice, and I address you in the hope you may consider my remarks worthy of a place in the *Royal Agricultural Journal*. Most people have long given up, as erroneous in principle and unprofitable in practice, the *winter* grazing, or attempting to *fatten*, oxen in the field (exposed to wet and cold, and injuriously *poaching* the land) at that season; and it has become a general method to bring turnips to the homestead to feed store oxen, in addition to their consumption of straw in their mere manure-making occupation, as well as for the purpose of *fattening* in enclosed buildings those animals, whether oxen or pigs, intended for immediate sale to the butcher; but when such a proposition is made as bringing in turnips to be consumed by sheep in sheds at the homestead, or on particular spots on the farm, if a large one, most men are startled at, and immediately condemn, the supposed extravagance of carting in the sheep's food, and carting out the sheep's manure; probably because 'it is considered that the commoner mode of taking the sheep to the turnips is the simplest way of manuring the land; nevertheless, I venture to believe that shed-feeding will by-and-by become more general for the winter-grazing or fattening sheep.

I am not going to trench upon the ground so well occupied by Mr. Lawes in his late paper on sheep-feeding, but shall confine myself to inviting the comparison between field-feeding and shed-feeding sheep for the butcher in the winter or colder and wetter months of the year. I have doubts whether in general the shed-feeding of sheep in summer will prove the best. I believe to Sir Richard Simeon, who for some years has fattened a large number of sheep *throughout the year* in stalls, is due the merit of having first adopted this practice as a system, and on a large scale. The late Lords Talbot and Yarborough, and a few other gentlemen, followed Sir R. Simeon's example to a certain extent, but general attention has not been drawn to the practice, and it appears to have been so little considered in all its bearings, judging partly from remarks of many who have visited my

sheep-shed, that I venture, though with diffidence, to address you on the subject.

Careful experiments that I made led me to the conclusion, urged upon me by Mr. Huxtable, that I was wrong in using Sir R. Simeon's method of stalling or tying-up each sheep, and that they fatten quicker when loose, in pens of half a dozen; and if so, there is economy in carpenter's work and materials in fitting up the shed, whilst less time is occupied in feeding the sheep than with the stalling plan; and, therefore, although I still use both methods, because it has not been convenient hitherto to alter the arrangement in my first sheep house, I much prefer penning to stalling the sheep; and the butchers invariably select the loose sheep first (for I usually sell at home); and another advantage in the loose system is, that the sheep will be found more fit to travel to market than stalled sheep, which often require to be removed out of their stalls a few days previous to sending to market, unless they are conveyed there on wheels.

I will now endeavour to convey to you my notion of the more general application of this system of feeding, and then to describe what I conceive to be as economical and useful a building (beyond a mere make-shift) for the purpose, on the majority of farms, as I can suggest. Given a crop of turnips, the question to be determined is, the most profitable method of consuming it with sheep in the winter months, assuming that the owner of the crop desires not only to maintain a certain quantity of store sheep, or his breeding flock, but also to fatten off wethers or draft ewes. If the land is strong, it will be injured by much treading in wet weather, and the sheep will then thrive little, barely, if at all, *maintaining* their condition for weeks together. If the land is light, it may no doubt be benefitted by treading; still, here the sheep will at times not *fatten*, exposed to cold and wet, and great is the expenditure of extra or artificial food, improving in some degree the land, perhaps, but not *fattening* the sheep, or very slowly; meanwhile the consumption of the turnip crop is rapidly proceeding, the interest of one's money long dormant, and the benefit the land is to derive from the manure dropped daily upon it is very greatly neutralized by evaporation and the washing away of a great portion of it from the surface of the land in heavy rains; it is only in favourable weather and upon

the lighter soils, that the plough can follow closely upon the sheep and bury the manure, and considerable time will elapse after the earliest turnips are fed off before the following crop is sown; besides, the sheep frequently catch colds and epidemics, and become diseased in the feet, and then one is disappointed in the sale, both as to time and weight. Now what I wish to throw out for consideration as a somewhat general practice is this, whether it be not preferable in winter to *confine the field-feeding* of sheep to the mere maintenance of the store-sheep or breeding-flock, and to conduct the *fattening* of those sheep destined immediately for the butcher in sheds. In the latter case, properly attended to, they are in no way retarded in their progress by the weather, are constantly *dry* and healthy, fatten more quickly, consume much less food in proportion to their progress—the animal heat being kept up by shelter and warmth, instead of at the expense of food—the money is turned much quicker, the manure is so much richer and so much more effective, that, applied as it should be to the land just previous to sowing the following crop, it is more efficacious, or a smaller quantity suffices; and lastly, there is no *waste of food*. All these advantages are to be weighed in the balance mainly with the labour and expense of carting in turnips and carting out the manure, and the expense of buildings.

It must of course in this, as in other methods of conducting farm operations, be a matter for consideration with a farmer, whether the circumstances under which he is farming (whether in relation to the quantity or extent of his land, the labour of carting, either in respect to level, or distance from the homestead or field-shed, or as to his general management) are such as to render it worth his while to make the experiment in question; but assuming either that he can satisfactorily erect, upon a large farm, suitable sheds at certain points, to which the haulage from several fields and back again might be satisfactorily accomplished as the successive turnip-crops were applicable, or that the distance to and from the homestead be not too great, I submit that the subject is worth the attention of farmers, and the above circumstances being *favourable*, I would suggest the following arrangement—carrying from the field to the shed half or a portion of the turnips for the fattening sheep; and I believe that in this manner a greater number of fat sheep may be turned off the farm with the same quantity of roots now grown, whilst a larger number of store sheep or a larger flock may be maintained in the field if desirable, less of the crop being required for the fattening sheep. My own practice is to fatten out one lot of sheep in the winter thus:—To take the manure made in the shed and mix it with ashes under an adjoining open shed,

where it will dry readily; and either to lay it on the land just before the last ploughing for the barley-crop, or to drill it in with the turnip seed. It may be a further question, whether, particularly on the stronger lands, the young growing store sheep should be kept in the field or in the homestead at certain periods, with open sheds and yards to run in; but with regard to *winter-feeding* of sheep, if it is to be done at all, as a mode of profitable consumption of turnips, I incline to the opinion that the shed-feeding system under certain, and not uncommon, circumstances is likely to be more extensively practised as the right system. I find that after the severe weather sets in, the butchers are glad enough to come in search of house-fed sheep, not being able then to find in one's neighbour's fields as many sheep fit for their selection as they require. I think the following mode of constructing a shed will answer two useful purposes at no great expense; adapting it for fattening out in the early part of winter, in one lot, a number of sheep, and then serving as a permanent *lambling-shed*. To be constructed, say, of larch uprights, sawn down the middle with the bark outwards, or, if peeled, to have a coating of *vegetable* tar or rough paint, with a span roof, thatched or *space-slatted*, thus increasing ventilation, and saving one-third in the quantity of slates, and reducing proportionably the weight upon and necessary strength of the roofing; a height of 4 feet to the *plate* will suffice; a paved walk down the middle of the shed, the troughs being placed on either side, and next to the passage, for convenience in feeding and cleaning; each side to be divided into pens with poles or rough fencing; the gates by which the sheep enter the pens being so arranged, that when the shed is required for lambing, the whole width shall be available by the gates folding across the pathway (in the manner railway gates are fitted across a line), and the south side or elevation of the shed (if not both sides) being fitted so that the woodwork can be folded back or be lifted up for the general convenience of the shepherd, and the admission of the sun and air, and for the more easy emptying it of the manure; the several partitions of the shed being further subdivided by the shepherd for his ewes and lambs, as he may desire, with hurdles. The sheep to be upon *gratings*, made with oak frames and deal tops $\frac{3}{4}$ of an inch between the bars, requiring no litter excepting for lambing; beneath the gratings, which should be supported on either side, without cross supports, which are inconvenient in emptying the pit, should be a tank or pit in brick-work, or rammed with marl, not less than $2\frac{1}{2}$ to 3 feet deep, so as to contain all the manure dropped by one lot of fattening sheep, thus avoiding the necessity of disturbing the animals for the removal

of the manure. If a little gypsum is thrown over the gratings, and ventilation is freely given, the sheds will not have an offensive smell; sheep-sheds, I have found, should not be so warm as ox-sheds. Mine are so contrived that an *even* temperature can be readily kept up of about 50° in the latter and 45° in the former. Pens measuring 8 feet by 6 will be found a convenient size for six Down sheep, thus giving 6 feet in width to each pen, and 3 feet for the walk down the middle; the shed will require to be 15 feet wide, the length being determined by the number to be provided for. A rough shed may easily be constructed for experiments, but it may be worth while, when erecting a permanent building as described, to add a similar or an ordinary shed as a wing on either side, which may be used for a variety of purposes, thus enclosing and sheltering the lambing yard on three sides.

The expense of attendance is trifling, if boys are principally employed, little exceeding what is required in the field; and the cartage of turnips not so serious; about 2 tons per week, in addition to other food, will be consumed by 50 Down sheep. The average time required to fat sheep in this way is about twelve weeks. I do not enter upon the subject of feeding in detail, because much has been written upon it, nor do I pretend to have satisfied myself whether I use the best proportions or kind of food; and the object of these remarks is a mere *comparison as to feeding in winter in or out of doors*. I doubt whether, as a general result, an increase of weight exceeding 2 to 2½ lbs. per week per 100 lbs. live weight should be reckoned upon, although there are much higher statements made upon this point.

I have had a sheep increase for three weeks at the rate of 4½ lbs., but it will sometimes be found that a sheep will not increase at all, whether in or out of the shed, for weeks; and for obvious reasons one must not expect general results to be as favourable as those of particular experiments. Fixed sheds, suitable for thus feeding sheep, need not necessarily be expensively constructed; I have never yet met with a good plan for thoroughly sheltering sheep in the field, combining what we require—cheapness and portability. I conceive long-woolled sheep would fatten in sheds equally as well as the short-woolled, if not kept in so warm a

temperature. For winter-feeding, when the sheep have turnips, there is no need for the expensive arrangements for laying on water in the sheds that are sometimes to be seen; and I do not think much objection need be urged to the plan of shed-feeding sheep in respect to expense, if the buildings are constructed as I have described, and are made to answer other purposes—a great desideratum in farm-buildings. I have tried placing the sheep on a brick-floor with an incline to a tank, littered with chaff; but they were too wet, and the consumption of litter was too great; I therefore prefer the gratings, which will wear a long time: there is, however, economy of litter in lambing under a shed of this kind, from the moisture so readily escaping from the straw through the gratings; none is necessary for the fattening sheep. I cannot speak confidently on the point, but experiments I have had made give a weight of more than 2 cwt. of excellent pungent manure—weighed before it has dried thoroughly—from each sheep in twelve weeks; this applied directly to a young crop is very valuable, whatever the amount may be.

I beg to repeat, that the general arrangement of this mode of sheep-feeding has been derived from that of Sir R. Simeon, from whom I have received much kind information; the penning the sheep loose is the result of careful experiments I made at Mr. Huxtable's suggestion, whilst the plan of adapting the shed to lambing and other purposes is a notion of mine for the sake of convenience and economy; and that my object in addressing you is the hope of usefully inviting investigation of a practice on which I have had frequent inquiries to answer, but which has not been as fully and fairly considered as I think it may be, with advantage to the agricultural community.

I will just add, that an easy way of trying the experiment is to have the gratings raised on *feet*, so as to be available in any spare or rough shed for a time, or in a barn; if a pit should ultimately be determined upon, the gratings will be available on removing the feet.

Believe me to be yours very faithfully,

DUDLEY PELHAM.

St. Lawrence, Isle of Wight, Jan. 15, 1850.

—Journal R.A.S.

WHAT CAN OUR LANDLORDS DO FOR US?

BY A FARMER.

This question assumes at the present time a very important aspect. After having been for nearly half a century the object of the greatest solicitude on the part of the Legislature, the farmers are now assured by the highest authorities in such matters, that they are never more to look for a return to anything like the old Protective measures. It is not our intention to discuss the propriety of the

proceedings which have gradually brought about this consummation: the question which arises to the mind of the tenant-farmer is, To whom am I now to turn for assistance? What can my landlord do for me?

We purpose endeavouring to answer this important question as business men, and with no sympathy for the patronizing airs assumed by some when addressing tenant-farmers. A business connexion is all that we desire to see between landlord and tenant, and it is such a connexion alone that will be mutually and permanently beneficial.

What then can our landlords do for us? This inquiry has been variously answered; one set of men asserting that we need no assistance from them. Mr. Caird, the leader of this opinion, in plain language assures the world that the whole of the land in Great Britain is so miserably farmed that we have only to adopt his *panacea* of high farming, and the difficulty is at once overcome. Mr. Caird formed this flattering opinion of English agriculture from observing the changes made by an enterprising neighbour, on a piece of ground which had previously been much neglected. Judging from this example, he concluded that every other farm was in a similar condition, and might be equally improved. This assertion has been so often answered that it would be going over ground already worn bare, to recapitulate even the heads of the arguments successfully brought to bear on the subject. It may be enough to say, that the only reason why so much change was made on Auchness farm was that it had been allowed to remain, up to the date of the improvement, 30, 40, and even 50 years behind the farming of thousands of acres in various portions of both England and Scotland. And, before Mr. Caird can expect his high farming recipe to relieve the present agricultural distress, he must start with Auchness farm as *it now is*, and add other 30 or 40 per cent. to its produce. Until he has done this, it is unnecessary to point out the peculiar local advantages of the farm held up to our admiration—advantages in which it is superior to the great majority of farms, and consequently a most unfair subject for comparison with them.

But not content with Mr. Caird's reply to our inquiry, several landowners have propounded an answer of their own. They have themselves told us what they can do. High farming, as involving no sacrifice on their part, and throwing all the difficulty upon the farmer, is insisted upon in terms nearly as strong as Mr. Caird adopted. They seem to have thought that there was something magical in the words "high farming," and hoped by a liberal use of them to charm away some portion of the difficulty surrounding them. There must have been something extraordinary in the character of

this difficulty which caused so many landed proprietors to forsake the privacy of their agent's office, and publish the system on which they proposed in future to manage their estates, in various newspapers. We have already remarked the pertinacity with which the charges have been rung on the words "high farming," and we cannot conceal our wonder at the short-sightedness which leads men to publish to the world that their farms had previously been allowed to remain in a state of *low farming*.

The answer of the landowners themselves to our inquiry was not, however, quite so pithy and sententious as Mr. Caird's: in addition to "high farming," it contained other equally handsome offers on their side. For instance: some of them, in their published letters, offer to provide additional accommodation for cattle; and all of them wish to drain.

With regard to the first part of this proposal, namely, to provide additional buildings, we would like very much to know from what new discovery in the management of cattle this want of extended accommodation has arisen? Does not this offer rather prove that hitherto these estates have not had sufficient buildings? and does it not show very plainly that as long as ever their tenants were able by the old prices to pay their rents, no additional buildings would have been mentioned?

As for the offer to drain, we ask, with surprise, have the advantages of draining been so little known to these landowners that it is not until a certain diminution of their rent-roll stares them in the face, that they think seriously about this first of all improvements?

The picture thus given by the landowners themselves of their estates, as farmed up to this date beneath their natural capabilities, unprovided with sufficient buildings, and undrained, is certainly anything but complimentary; and we can but remark that here, as well as in "high farming," the great onus of the difficulty is still thrown upon the tenant. With regard to draining, especially, it will be four years before a farm can be drained; and it will not be less than eight before the tenant can reap the benefit of the outlay, during the whole of which time he must, as the offer to make these improvements prove, be paying a greater rent than the present prices justify the landlord in expecting. It is unnecessary to enter into any arguments respecting the utter fallacy of the hope that improvements effected after and during the depreciation in farm produce can be of the slightest use in enabling the farmer to meet the changed circumstances in which he is placed.

Having thus discussed what these landlords' letters do contain, we will next examine what they do not contain. In the first place, there is not in

any of them the slightest allusion to the delicate subject of rent. This is a most important omission. The rapidly-increasing population of Great Britain, its limited size, the industry and enterprize of its inhabitants, will always ensure the utmost possible rent for the land, calculated upon the highest prospective average prices of agricultural produce; but when all the farmer's calculations and expectations are set at defiance by a fall of 30 per cent. in prices, the injustice of demanding, and the folly of expecting the same rent become at once apparent. For these reasons, therefore, the first answer to our inquiry of, "What can our landlords do for us?" is, *They must lower their rents.*

Nor does the duty of the landowner end here. We are anxious to see a style of business introduced between landowner and tenant, more consonant with the business-habits of the nineteenth century than has hitherto been usual. We wish to see the "tenant-at-will" system abandoned—the trusting to the "honour of the proprietor" laid aside—with all the patronizing airs of the one and the servility of the other; we wish to see the important business of farm letting and farm taking conducted on the hard matter-of-fact style of other mercantile transactions.

It is to us a matter of unfeigned surprise to observe the steady progress farming has made, considering the general existence of the custom of letting farms from year to year; a custom which, if persisted in, most certainly ensures poverty to the tenant and diminished rent-roll to the landowner. No argument we can use places the folly of this practice in such strong light as the "Report of the Committee on Agricultural Customs" has done, and to it we refer for proof that "*want of proper security to the tenant and bad farming* are synonymous and convertible terms; and that those districts, as portions of Northumberland, Lincolnshire, and Norfolk, which are notoriously the best farmed and the highest let, are precisely those in which leases and compensation for unexhausted improvements are the rule of practice." The second answer to our inquiry of "What can our landlords do for us?" is *Farms must be let on lease.* As to the terms, &c., of the lease, there is of course great diversity of opinion; but if the real object be kept in view, viz., to give the tenant security for his capital, and to protect the landlord from injury, we shall not greatly quarrel about trifles, provided the lease be of sufficient length. It is a poor compliment to the intelligence of the day that landowners yet require instruction in what we consider the first principles of farm management, the foundation of every improvement—a lease. We do not wonder that,

under the opposite system of yearly letting, farming should in so many instances be backward; our astonishment is the progress it has made. It appears, from the Report on Agricultural Customs, that not one-tenth of the land in Great Britain is held on lease. Under such a system, farming may well contrast in spirit and management with our manufactories.

If a person wishes to do justice to the land he cultivates, it will be four years before he reaps the consequence of liberal farming. But if the farmer is only allowed security for one year, can it be expected that he will sink his capital for four? Would any one expect a manufacturer to be guilty of such folly?

But enough on this point: sufficient has been said to convince men who are not wilfully ignorant: we will proceed with our inquiry. What more can our landlords do for us, after lowering their rents and granting a lease? The very term, "granting a lease," which we have inadvertently used, exemplifies the connexion as at present existing between landlord and tenant, the more strongly that it is in every one's mouth. Who ever heard of a merchant or a manufacturer "granting" a sale? It is this very position which, owing to the constant demand for farms as compared with the number of them to let, thus enabling the owner to dictate the terms on which he will let his land, is the reason why we are obliged to put our question in the somewhat humiliating form of "What can our landlords do for us?" It is true, we can do something for ourselves by refusing to take a farm except on a lease. But for the reason before mentioned, there will always be farmers found, who are content to leave to the owner the option of *granting* a lease; and until we can satisfy the landowner that the system of yearly letting is synonymous with low rents, as compared with the capabilities of the soil, we can have little hope that the short-sighted policy will be abandoned.

Let us, however, suppose that the landowners have been convinced (to put it in the mildest term) of the reasonableness of lowering their rents to meet the altered times, and that they have seen the propriety of "granting" leases—they will then find, and never till then, that their tenants will be ready to adopt one of the suggestions contained in the landlords' letters. They will then be quite ready to drain; they will then enquire after more accommodation for cattle feeding; they will then—and we repeat, never until these pre-requisites are secured—the tenant-farmer will then be able to adopt to the fullest extent Mr. Caird's system of high farming.

SPARKENHOE FARMERS' CLUB.

MR. HARRISON'S LECTURE ON CHEESE-MAKING.

Mr. CHAMBERLAIN, of Desford, was in the chair on this occasion, and opened the proceedings of the day by observing that when Mr. Harrison invited the club to meet at his farm, he also said he had no room in his house large enough to hold them—so he would have his barn prepared, and hoped he might have a large attendance. He (Mr. C.) was glad that hope had been fulfilled; and he was also glad to see so many ladies among the company: it was a proof how desirous they were to learn everything that would tend to promote the well-being and comfort of their husbands and families (applause). The Chairman then called upon their host to read his paper.

Mr. HARRISON complied with this call by reading the following paper:—

The subject appointed for this day's discussion is cheese-making; but as it is necessary to provide a herd of cattle to give the milk from which the cheese is to be made, and also food and pasturage from which the cattle are to procure that milk, I shall venture to occupy a portion of your time upon a few points which ought to have the dairy farmer's attention antecedently to the process of converting the milk into cheese.

First, I notice food and pasturage. And here let me observe, that this paper is not supposed to be perfect in all or any of its parts: it is offered *only* with the feeling that it may suggest some ideas to my friends and neighbours which their further experience may improve upon. Without further preface I address myself to the task.

It is the usual practice of this neighbourhood to retain a certain portion of the farm, and generally some of the oldest turf lying contiguous to the house and farm-buildings, for the use of dairy cows; and this plan is maintained, not only month after month, but year after year; and so strong is the prejudice in favour of age in the turf, that many farmers would by no means turn their cows upon seeds. They would say, by so doing they should certainly spoil their cheese. Others, also, are equally averse to manuring or liming their dairy pastures, asserting that such management would have a prejudicial effect; that the quality would be deteriorated, or the cheese would not stand. Now I cannot tell you from my own experience whether there are substantial grounds for such opinions; but it must be obvious to all thinking persons, that if these opinions or prejudices are fully carried out,

the dairy pastures must decrease in quantity, till finally they will produce no cheese at all. Such has been found to be the case in Cheshire; and bones I believe have been applied with good effect as restorative of the cheese-making properties of the soil. I am fully aware it will be asserted that practice does not bear out this theory here, and that there are Leicestershire dairy pastures which have been grazed upon for many years, which are rather improved than injured in that time. I trust, if any gentleman should in our discussion this evening support such assertion, that he will also tell us as nearly as he can how many acres of meadow ground were robbed of their hay by his cows whilst they were daily turned out in the winter season, or how many tons of turnips were consumed by his sheep stock upon the sound daily pastures, when such could not be eaten upon the dirty ploughed land.

It is a matter of great consideration to all who make cheese-making a point of profit, that they secure to the land the due constituents of milk. A cow producing four cwt. of cheese in the season will remove from the land annually inorganic matter to the weight of upwards of 19 lbs., as phosphate of lime, magnesia, iron, &c.; which can only be restored to it by extraneous aid.* Soils rich in the before-mentioned ingredients may long withstand this slow exhaustion of their inorganic riches, but the constant withdrawal of these must eventually be found, and the milk will be wanting in its true constituents. Besides this exhaustion of the inorganic particles of the soil, a cow making four cwt. of cheese will, through the medium of the soil and vegetable, bear from the field to the dairy 240 lbs. weight of carbonized and nitrogenized matter. Now I cannot say that Nature in her abundant resources will not supply this demand; but I much question whether she will, even from her great magazine the atmosphere, replenish the exhaustion fast enough, and keep acre for acre (year after year) producing the same bulk and quality of vegetable food. I leave the solution of this point (as far as theory goes) to be settled in the discussion which I hope will follow the few remarks I shall venture to

* Since the above calculation was made, Professor Way's lecture on this subject has appeared in print. He makes a dairy cow to remove 27 lbs. of inorganic matter annually—a much larger amount than I have named.

offer you; but as far as practice is concerned, I must bear testimony to the fact that land manured and irrigated will bear the most grass, and cows fed on grass so produced will give a richer milk and yield a greater quantity of cheese.

I am willing to acknowledge that there may be apparent grounds for the assertion "that cheese cannot be made well from seeds or manured land;" for in the autumn, when the grass of the pastures is richer than in spring or summer, we have here, on this farm, experienced a difficulty in making the cheeses keep their shape, and maintain the compact appearance which (with the same care bestowed upon them) they will ordinarily assume. I believe it to be very possible that persons have experienced some inconvenience in manufacturing a cheese when their cows have gone upon seeds, or into a lately manured pasture; and not having patience and perseverance enough to try other plans, they have at once pronounced the pasturage to be the cause of an evil which they have chosen rather to avoid than to overcome. I wish to show you the effect of the change of food upon the cheese. Here is one which is anything but creditable in appearance, made from the milk of cows fed on the rich grass of autumn, with turnips; the quality is very fine, but a stack of this description in Leicester fair would be at once pronounced a failure. We meet with such cases occasionally in cheese-making, and unless patience and perseverance are had recourse to, and trials are made to obviate the difficulty, the grass, seeds, turnips, producing such cheeses, must be summarily and lastingly condemned. I believe that by taking away a little of the cream, or by putting the milk together at higher temperature, these cheeses might be made to stand. I must here express my conviction, from five years' experience, that seeds or manured turf are not decidedly prejudicial to the cheese; and my belief that without manuring and attention the land will deteriorate, and finally become comparative useless for dairy purposes.

This perhaps may be a suitable place to observe, that land of second-rate quality for the feeding of cattle may not be unprofitably managed by adopting the production of cheese as its mode of employment. This farm does not feed cattle well, beasts taking a considerable time and never becoming thoroughly fat upon it, without the assistance of corn or oil-cake. It also yields butter indifferently, which might be expected from the fact that its grass feeds stock slowly. The first year we attempted cheese-making we set up the Sunday's milk for butter, and the calculation I then made as to the proceeds of this milk gave this result:—whilst the cows were making £7 value in butter, the same made £13 value in cheese.

Stock.

I will now notice briefly the different varieties of stock employed in the conversion of vegetable matter into cheese. And although I admire the large size, symmetrical form, the silky hair, the early maturity, and the exterior beauty of the Durhams, I must admit that as far as my inquiry goes, the old long-horned breed are at present the best adapted for cheese-making purposes. Whenever I have heard of great quantities of cheese per head being made, it has always been (or with a single exception) from a dairy of long-horned beasts.

It must have been apparent to every one who has had the care of stock under his hands, that some individuals will bear greater hardships than others, and that such will hold their flesh, or rather increase in weight, whilst the same quantity of food given to an adjoining animal will gradually make her poor. I have noticed this particularly with some half-bred Herefords; let circumstances be what they might, these were always in the best plight in the herd. Now, I have had little to do with long-horns myself; but if the assertions of some of my friends are correct, the old long-horned breed of cattle must be the most economical for a dairy farmer's purpose, as they will bear more hardships, and consume less food while dry and in an unprofitable state—as well as when milking, they will produce most of that liquid from which our cheese is to be made.

But the object of our society is to endeavour to trace effects to their causes; and to enable us by the combination of thought and experience to obtain something beyond a superficial acquaintance with the laws which regulate and control our operations in drawing from the soil its various productions. The purport of my paper this afternoon is to trace effects to their causes, and to raise some inquiry into the whys and the wherefores in some of the branches of the art of cheese-making. It is right for me, then, to question whether this property of making large quantities of cheese, and living upon small quantities of food, is alone peculiar to the long-horned breed. I believe it is universally admitted that all the varieties of cattle now found in England sprang originally from one stock; and that the distinctive marks of form, size, and colour originated in local circumstances, and have been extended and fixed by cultivation alone. I believe, too, that in all countries where cattle run wild and unrestrained, the milking properties are by no means so fully developed as they are when tamed, and under the care and cultivation of man. I find, also, that the long-horned cows are not estimated so highly for milkers in other parts of the kingdom as they are in Leicestershire and Warwickshire; and that in distant places the Herefords, a race of

cattle which we here regard as very indifferent milkers, are for the property of milking preferred before them. I think these observations will somewhat bear me out in a suggestion I am about to make—that the milk-producing qualifications of the Warwickshire and Leicestershire long-horns may not be more *inherent* in this than in other breeds of cattle, but may be the result of cultivation, of long continued care. I think I may be fully justified in venturing such an opinion, for a glance round this neighbourhood will show that dairies of long-horns are chiefly, if not entirely, in the possession of farmers who have for many years cultivated and maintained these breeds, chiefly in reference to their milking qualifications. I dwell rather strongly upon this point; for if years of care and cultivation have made the long-horns as a race the greatest milk-producers, we have then the course pointed out for us to follow by which we may hope to succeed in making the short-horns a cheese-producing breed.

It may be expected, perhaps, that I should draw a comparison between the actual weight produced by the long-horned and Durham, or short-horned dairies. I have heard of 5½ cwt. of a cow being made from long-horns; I have heard, too, of 5 cwt. from short-horns; but I think it would be unfair to compare the distinct breeds in reference to their cheese-making properties, unless there was also a fair comparison of their food. I believe that in either case, such produce was in great measure the effect of management, and was not entirely to be attributed to peculiarity of breed.

A gentleman lately told me, in answer to my inquiries, that his cows fed their calves first, and then made 5 cwt. of cheese during the season! And the best of this was, that these cows (and long-horns they were) ate nothing but a little grass in the summer, and barley-straw in the winter! Seeing, sometime afterwards, a long-horned dairy not far from this gentleman's house, I inquired if they made much cheese. "Not above 3 cwt." was the reply. I mentioned my 'surprise,' for Mr. So-and-so made 2 cwt. more. I then was informed that his cows ate what they liked!

It is with a dairy as with feeding. Cows, to produce, must first consume. When a breeder says of his pet beast "he has had nothing to eat," and, on being gently pressed on that point, "only a little cake or corn, or a few turnips;" in short, whatever he would eat; so these cows, though they may be hereditary milkers, without constant attention to their comfort—without abundance and variety of food—would not be annual producers of 5 cwt. of cheese. The dairyman's object in forcing the yield of milk to the greatest possible extent, should be circumscribed only by calculations—by

this question, "will it pay?" And there are certain times, as at this present moment, when the cold weather is keeping back the grass—in which he must not be too particular on this point, but must maintain their milk by artificial food, till the fields are ready to receive the cows, though it be at considerable cost, and at a rate which will not pay.

SHEED.

We will now take some notice of the management of the cow-shed—a subject of great importance to the dairy farmer; for in this place, according to the opinions of some authorities, the cows should pretty constantly be kept, and there receive their supply of water and food. It is said that, by a due attention to warmth, provision of food, &c., there is no reason why the cheese-making process should not go on through the whole of the winter; and there is, in fact, no really preventing cause why such might not be the case. To meet, then, a winter supply of milk, large quantities of hay must be provided, and extraneous aids—such as corn, grain, and oil-cake—must be bought, which will (as far as my experience has hitherto informed me) considerably reduce the profit upon winter-cheese making. Whilst I admit the possibility of making cheese throughout the winter (and we have done so here), I still am doubtful whether it is a proper plan to be followed as a pound-shilling-and-pence speculation. I believe it to be more profitable to consume what would be saved for hay for the winter feeding in an early stage of growth, as the same quantity of ground will yield more milk when its produce is consumed as grass than after it is dried up and made into hay.

There is also another point to be considered in connexion with the question of the winter dairy system. Cows must be allowed to go dry two months at least before calving; and this rest may as well be given during the shortest days and coldest weather—and they may, as a matter of convenience, be made to have this rest at the same time. I will not, for various reasons, advocate the uninterrupted making of cheese upon a farm, but will rather confine my observations to the best methods of managing the cows for the period of nine or ten months in which they are useful for dairy purposes.

We will take the beginning of March for the time of commencing our notice of the management of the cow-shed, and will suppose that there is laid up a store of Swede turnips—"or mangold wurzel," some will say; but I do not, from my experience, speak in praise of this root) sufficient for the herd till the middle of May; also of hay, enough to give a little every day to each cow after calving till grass; and an abundant supply of straw, which straw is to

be picked over by the cattle, allowing them to make plenty of waste for their litter.

The cows at this time should be found in good condition, full of flesh, and healthy in their skins—the forwardness of them having calves or shortly about to do so. The calf, if we consider the profit of the cheese, according to my judgment should be immediately taken away from its mother, and the cow kept warm and abundantly supplied with food. I must here notice, that warmth has a very great influence upon the secretions of milk; and even a walk out of the shed for the purpose of drinking, tends very materially to lessen the quantity given by a cow in the cold season of the year. Every cow-shed, for milking beasts especially, should have a supply of water, so that the animals may help themselves without exposure to the influences of wet weather or a lower temperature. I must beg to inform you, that this is no fancied or theoretical view, but is actually the fact; and that a great decrease in the quantity of milk delivered in our dairy was traced to such simple cause. Some one, for mischief, had sent down the main-water pipe, that supplied the shed, a small bundle of straw, which lodged in one of the branches and completely cut off the flow on that side. Sixteen cows were then in milk, and half (in consequence of the water being cut off from them) were turned out twice a day to the pit, not 100 yards off, to drink, and were immediately brought back again. A complaint was made to the man in charge of the cows that the milk was falling off considerably in quantity—and, further inquiry being instituted, it was ascertained from the milker that the loss lay upon the eight cows turned out to water, for every one had abated in her milk. This accident was at the time very satisfactory to myself, as it proved that an outlay which had been made upon theoretic views was really useful, and had not in practice been thrown away. To make you fully assured that the abatement in the milk of these eight cows was caused by their simple exposure to the unfavourable influences of a lower temperature and different atmosphere, I must tell you that, with the removal of the stoppage in the pipe, and the consequent flow of water permitting the cows again to drink in the warm shed, they gradually recovered their former quantity of milk.

So much for the influence of warmth upon the secretion of milk; but a time must come when the herd must leave the shed to get the principal part of their living (for a short time at least) in the open field; and then care must be taken to prevent the changes of temperature from suddenly and unduly affecting them. Before turning them out, the doors of the shed should be partially unclosed, gradually inuring the inmates to a change. The first time for

the herds going abroad should be chosen when the wind is still and the sun is shining; they must not remain out too long at a time, nor must they be exposed during the night until the temperature of the atmosphere is considerably and permanently raised.

But although I admit there is generally a necessity for turning out the dairy beasts for a few weeks in the spring—that is, until a growth of clover or grass rises to the scythe—I must, both upon principle and experience, recommend the soiling of cows throughout the summer-season as a matter of economy, and thence as a point of profit. It would be difficult to obtain the relative produce from land grazed by the cattle themselves, and from other land mown daily, and its grass brought home. But any one who has fed off a quantity of seeds or grass in this way, will be surprised that a given quantity of land has kept a given quantity of stock so long; and it must be remembered that land well attended to will furnish two, three, or four crops in one year. I shall perhaps be told that this mode creates expense and increases trouble—which I at once admit; but I think if any one will try the method upon my recommendation, he will tell me hereafter that he is well paid for his extra labour by the quantity of extra keeping which he thus obtained from his land. Some people will say that exercise is necessary to the cow for milking. We allow ours to walk out in the cool of the morning, and during the night in the heat of summer; but such exercise as that given to a herd by the attack of the gad-fly I thoroughly object to, and do my utmost to prevent.

In forward seasons we may begin to mow seeds about the third week in May. Rye will furnish a little keep before; but it generally runs so rapidly, that this food is of little value more than a few days. After seeds, grass comes in, then vetches, a second crop of seeds; and about the end of August, with management, we have plenty of turnips, cabbages, and spring-sown vetches, to mix and alternate with some later saved grass. Get once over May, we generally find little trouble in obtaining an abundant and regular supply of food. Towards the end of the year, if the weather is favourable, and the cows are housed at night, I should not recommend that the beasts should be tied up entirely; but that they be turned out in the middle of the day. When the cold season sets in, or heavy rains make the land tender, the cows are better confined wholly to their winter quarters. There is then less waste in flesh, milk, and manure; and, with warmth, a smaller quantity of food is consumed.

But if cattle are to receive the principal part of their food in sheds, very great attention must be given to them. They must have change and variety

in their food, and they must be regularly served with it. A man in my employ, who attended to a lot of thirty-three milking beasts, went to the funeral of one of his relations; I left home the same day on business, giving these cows in charge to a young man who lived with me at that time, under his promise that they should have plenty to eat. I believe he was afraid of the rain, which fell on that day, and therefore neglected his charge; for on my return at night I heard the cows in the shed calling loudly for something to eat. The next morning there was a falling off of milk to the extent of nine gallons, at night eleven, and the following morning thirteen. This was late in the year; but the cows, for that season, never recovered the quantity of milk which they had previously given.

I have mentioned this fact to show how very dependent the secretion of milk is upon the supply of food, and how much the success of dairy operations depends upon the attention bestowed upon the animals which are to produce the milk. Kindness, gentleness, and quietness, are requisites with cleanliness, in all engaged in a cowshed; and all bad tempers, quarrelsome dispositions, and noisy boisterous persons, should never be allowed to set their foot therein!

Ere we leave the shed for the dairy, I have a few words to say upon the time of milking. The usual method pursued in this county is to milk twice a-day—morning and evening. In Lincolnshire they will milk thrice, and in Scotland sometimes five times in the day. Last season I adopted the plan of milking thrice in one shed only; this season we are milking three times at both; you will therefore infer that I have proved it to answer. I will also tell you that, in May last, I mentioned this plan to a gentleman who supplies his milk to Leicester. He tried it upon a lot of twenty-nine cows, and he told me that on the third day from the commencement of his trial, these cows gave him in the day fifteen gallons more milk. I met this gentleman on Saturday last, and he said he should adopt this plan again. In addition to his former opinion of its utility, he gave me this further information:—that his cows had formerly been greatly troubled with sore bags, but after the thrice-a-day milking commenced he had no more of them. We have all seen the udders of the cows greatly distended with milk, and it is no wonder that the animal feels pain, and that local inflammation ensues.

Objections may be raised to this third milking—some will say the cows require more keep. I answer, the cows are machines to convert grass into cheese, and if I can make each cow do more work I save the outlay of capital in purchasing an unnecessary number of beasts. Some will say it must be injurious to the animal. The lot milked

last year thrice a-day on this farm are equal in health and condition to the lot milked twice, and are now open to inspection.

Before I quite close this portion of my subject, I must observe that milking qualifications in an animal are equally capable of transmission by descent, with the distinctive marks of the various breeds, or with their propensities to fatten; and if they are capable of transmission they are also equally capable of improvement by cultivation. It behoves, then, the farmer who rears the supply of cows for his own dairy, to be particular in looking for a good line of descent in the milking qualifications of all animals introduced into his herd. It behoves him to see that these qualifications are maintained in full power to each individual, and that they be further improved in his hands by stimulating foods and regularity of milking—by kindness, warmth, and general attention to their health and habits. In short, a dairy farmer should not only care for his herd, that they give milk at the present moment in the greatest abundance, but that they have their milking powers kept to the utmost stretch as the means of producing fine milkers in generations yet to come. Perhaps I ought not to omit some practical notice of the secretion of milk. It may be styled a sympathetic operation, and the supply, in a great measure, will be regulated by the demand. This is an all-wise provision of nature for the necessities of the young of animals; and we only follow the teaching of nature a little more closely by milking oftener than twice a-day. To use the words of our man who looks after a part of the cows, "The milk does not flow to the hands (that is, the udder is not so distended) now as it was in twice a-day milking; nevertheless, after milking a minute the supply will come." To illustrate more particularly the sympathetic affection between the action of milking and the consequent flow of milk, I quote this man a little further. He was speaking of a particular cow, and said she had no milk in her bag when he commenced milking; but it came by milking a short time, and in such quantity, that he has often wondered where she had previously put it. This man is not a physiologist or theorist: he spoke only matter of fact.

I am well aware that the efforts of many years may in a single season be cast away by some of the diseases lately introduced into this county; almost all of us, more or less, have suffered by them. Four years ago I lost upwards of thirty calves from the mouth-disease, and since then some of my neighbours have had half their dairy cows carried off by pleuro-pneumonia. It is to be hoped that these pestilences will, in the process of time, become less virulent, or that science may afford them more

decided relief. I believe it to be right in all of us to make known, for the benefit of the public, any good thing we may have discovered, even though it should expose us to the criticisms of our friends. I shall therefore tell you that one evil constantly hanging over dairy farms—and a great one it has often proved to be, viz., abortion in the dairy cows—has been successfully treated and prevented in the only three cases which have come under my inspection this season, by administering the specifics and doses of Homœopathy. This science is as yet but little known among us; it has been laughed at, and I have joined in the laugh; but I do so no longer. A trial of some months has convinced me of its efficacy as applied to animals, and I shall be happy to afford such information as my limited knowledge permits me to give, to any one who may wish to inquire into the subject.

We will now leave the shed for

THE DAIRY.

I will not attempt a minute and chemical account of the process by which the milk we delivered from the cow-shed is here to be converted into cheese, but will content myself with practical observations upon the management of the dairy. The object of all is to produce the greatest money-profit; and, according to my ideas, this is best achieved by making the best quality of cheese. At Leicester fair, last autumn, there was a difference in the value of dairies to the amount of 18s. per cwt., which, at 3 cwt. per cow, will give £2 14s. per cow., or £54 in a dairy of 20 cows. Now, when it is considered that a little extra care and attention form perhaps the chief item in the higher prices, it is surely worthy of consideration whether we can in any way amend our plans. There is also another point upon which I would suggest a question. Can we, by thought and contrivance, lessen the labour of cheese-making operations? I lived formerly in a county where butter alone was made. I had occasionally seen the cheese-pan at work on my visits from home, with all its attendant discomforts to the families in which it was employed; and in comparison with the easier labours of butter-gathering, I then certainly should not have been by choice an amateur producer of cheese. But a change in locality requires a change in management, and five years ago I was induced to contemplate cheese-making as the most profitable means of working this farm. As improvements had been carried out in other departments of agriculture, as well as in all the various trades and sciences of this country, I thought the art of cheese-making might be susceptible of improvement too. I was much indebted to several of our friends for the information their practical knowledge enabled them to give

me; but I determined, if possible, to do with less labour in the manual part of cheese-making. I tried several schemes—some rather expensive—some of them failures; while some were attended with success.

The object I had in view was to secure the whole of the curds, and also of the butter in the cheese. To effect this, it is necessary to avoid breaking the curd by the hand, either in the cheese-pan or the vat; for by much breaking and crushing, a large quantity of minute particles of curd and butter are separated from the mass, and are carried off by the whey, to the loss, both in weight and quality, of the cheese.

To remove the whey from the curd with the least disturbance, we introduced the use of the syphon; and to save lading out the remainder of the whey and curd from the cheese-pan into the vat, we adopted the plan of swinging the pans on pivots fixed to their centres. The cheese-vat is merely placed upon a lead, the pan is turned upon its pivots, and its contents are delivered at once into the vat; whilst the whey which had not been entirely removed by the syphon escapes into the vessel, where it is to be skimmed for the butter it yet contains. On reference to our last year's account, I find ten ounces per cow was the weekly average of the butter removed by this method from the cheese.

I will not unnecessarily occupy your time by a description of the mechanical means we have adopted, for I invited you to Bagworth Park that you might give them a personal inspection. I will now notice a few points that have become known to us in our experiments in cheese-making, after which, and the discussion which I hope will follow, I shall have pleasure in showing you the dairy, where the arrangements in use may speak for themselves.

One of the greatest desiderata now is a means of testing properly and accurately the strength of the rennet. So far as my knowledge extends, this can only be arrived at by actual trial. The common method is to make a large quantity; and by ascertaining the actual strength upon a cheese, there is some little guide obtained for future operations, so long, at least, as this manufacture of rennet will last. But it is of very great importance that a better guide for the dairymaid's use should be laid down; for all excess of rennet, after the production of curd—that is, all that is not required to convert the milk into curd—will remain in the cheese to promote early decomposition, and is often the cause of great pecuniary loss.

The process of cheese-making depends upon chemical causes and influences, which in themselves are as unvarying as other natural laws. To

procure the conversion of milk into curd, a certain degree of temperature must be obtained; and we have observed that 82-84 deg. (about 12 deg. lower than when it comes from the cow) is the proper heat to be observed in the summer season for putting the milk together, and about two degrees higher in cold weather, to allow for the greater decrease of heat by surfaces coming into contact with a cooler atmosphere. A thermometer is now a necessary appendage to the cheese-pan. I may as well add in this place that 52½ degs. is the proper temperature for conversion of milk into butter, and that two or three days' churning of cream (which we sometimes hear of) in winter before butter is collected, is solely to be attributed to its low temperature.

But although 82 to 84 degs. is the proper heat for putting the cheese together—producing, according to present experience, the greatest quantity of curd—still it is not then sufficiently high in temperature to allow its complete separation from the whey. To facilitate this separation, it is found desirable to run off a portion of the whey, which must then be made hot enough to raise the whole mass in the cheese-pan to 90 degs. This in a few minutes will cause the curd to fall; and the whey must then be drawn off as quickly as possible, for, if allowed to remain too long, it has a tendency to toughen the curd. Our practice is then to put the milk together at 82 to 86 degs., according to the weather. We let it stand an hour and a-half before breaking in the pan; this is half an hour longer than generally allowed; but as we wish to use the smallest quantity of rennet in converting the milk into curd, we find it necessary to give a longer time than ordinarily is allowed for its full conversion. After breaking and settling a few minutes, we apply a syphon to run off the whey, and for this reason—it disturbs and breaks the curd far less than is done by lading. From putting the cheese and rennet together, till the curd is removed from the pan into the vat, the time occupied is about two hours and a-half.

I have seen, both in Gloucestershire and in Leicestershire, a mill employed in grinding up the curd; and I notice often in our neighbourhood, also, that several break up by hand, to what I consider the injury of the cheese. I see, likewise, round us two, three, or four persons about a cheese-vat, crushing with their hands; and I have been told that it is generally thought right to continue such process for an hour at least, before the cheese goes to press. Now we dispense with a great deal of this (to us) unnecessary attention. The curd goes from our cheese-pan directly under the press without any hand-crushing whatever. There it remains ten or fifteen minutes; the edges of the curd are

then pared off, and put into the middle of the cheese, which is pierced with a skewer on both sides, and returned to the press. In a quarter of an hour it is pierced again—the edges are cut off on the opposite side—and again it is put under press; in half an-hour the cheese is pierced the third time—put into a dry cloth—and the press is now allowed to complete the work. I should explain that the press used in this process is a lever press, working up to 23 cwt., and that the weight brought to bear upon it at first is small, but is increased as the cheese advances in solidity. From the delivery of the curd into the vat, till it is fixed for final pressure in the press, about two hours are taken up; but for full half that time the person employed in attending upon the making may be occupied in the other work belonging to the dairy. And it must be borne in mind, that with the separation of the liquid from the solid matter, our trouble with regard to the former is ended, as there needs no carrying to the whey lead for skimming, and no further carriage from thence to the cistern. You will observe, in the dairy, the whey goes at once into the leads, and from them is removed by taking up a plug, which allows its escape to the cistern.

I need not go into the minute details of brining, salting, &c., as every one conversant with cheese-making must be well acquainted with them; but I will observe that many points which appear to be of little consequence to a casual observer will make a great difference to the economy or the profit of cheese-making.

It is the object of all of us—at least, it ought to be so—to make a good quality of cheese; and this is undoubtedly best achieved by making up at each meal immediately; every gallon of milk, so converted, will produce, at the lowest, sixteen ounces of curd; and there must be some mismanagement if it ever falls below that quantity. At the autumnal season the relative value of the milk for cheese-making is greatly increased, and will sometimes yield one-eighth more of curd to the gallon. With the above object (quality of cheese) we often combine also those of size and family convenience; and for that purpose milk will sometimes be kept till the next meal. In warm weather this keeping of milk is attended with some care, for unless the temperature is brought below 56 degs., milk will acquire an acidity, and the result will be a sour-milk cheese. This cheese will be of less value per lb.; but this will not be the whole of the loss; for experience has told us that the same measure of milk which has yielded 56 lbs. of curd in a sweet state, has, by a slight change, yielded only 45 lbs. To keep milk sweet over the meal it is necessary to cool it by water: 52½ degs. is the temperature of water, which, being brought in contact with the

vessel containing milk, and occasionally changed, will secure the milk from going sour. We have accomplished this object in our dairy by passing through it a running stream. By setting tins of milk in a trough through which this stream passes, we can keep the whole of the Sunday's milk sweet for Monday's use. There is also another advantage derived from this plan—by cooling the milk in deep tins, and occasionally stirring it, the cream is prevented from rising to the surface, and does not require the trouble of skimming and remixing with the milk, which reunion by artificial means is never thoroughly accomplished.

Among other discoveries from my various trials, I have found that tin vessels will not answer for cheese-pans. I thought to save expense by using such, but, after the first season, was obliged to lay them aside; for the chemical affinity between tin and curd is so great, that we could not separate it wholly by the breaker, and slip-curd, consequently, was found in almost every cheese.

I will close my remarks upon the dairy in Professor Way's words:—"Scrupulous attention to cleanliness is another essential of dairy management—the scalding, cleansing, and airing of the dairy-vessels being of the greatest importance. No stable and drain should be near it, and the cheese itself, where possible, should be separated from it."

CHEESE ROOM.

A few remarks upon the cheese room ere I close my subject. Too often, this is inconveniently situated under the slates of the house. In the summer it is too hot; in the winter it is too cold. The great heat of summer may be lessened by

hanging up wet blankets at the window; and I have just heard that, by allowing a few worsted threads to drop from these into a bucket of water, the blankets will be kept wet by the force of capillary attraction. In the winter the external air must be excluded as much as possible, and artificial heating by steam or other means must be employed. I recommend, where it can be conveniently done, that hot water should be used—the heat is more generally diffused, and the air is not rendered so dry as to crack the cheese.

With the utmost care employed, some of the cheeses will be found to crack. These should be filled up, and a little paper pasted over to prevent the attack of flies. I can only recommend as general rules, that you should allow no extremes of heat or cold, moisture or drought, to affect the cheeses whilst in your possession, and exchange them for money as soon as you can effect a sale.

When I offered to give a paper upon cheese-making, I did not anticipate that I should be forestalled in my subject by Professor Way. I refer you to him and others for the chemical analyses and composition of milk and cheese. He says he has merely condensed into his lecture the information that may be drawn from books. My paper is simply a practical exposition of the subject. Some of my remarks may possibly be found in books; whether they be so or not, I offer them to your notice as the result of my own observation and experience.

During the reading of the above paper there were frequent marks of approbation; and Mr. Harrison resumed his seat amid loud applause.

AGRICULTURAL STATISTICS.—THE HARVEST AND THE POTATO CROP.

The probable acreable produce of the grain crops in the present season, especially wheat, is a subject of great importance, not only to the farmer, but to the public at large. It is not without feelings of disappointment and mortification that we use the term *probable*, because in this country, above all others, there ought to be established such a system of agricultural statistics as would enable us to ascertain at the conclusion of every harvest the extent of the supply of human food raised upon our own soil, and, as a consequence, the amount of foreign produce which would be necessary to meet the deficiency. We trust and we believe that the disinclination hitherto exhibited by farmers to have the acreable produce of their farms made known is gradually wearing away. We are glad to be able to quote, in aid of the arguments we have

used upon former occasions in favour of the establishment of a system of agricultural statistics, the following remarks from the *Bankers' Circular*:—

"The necessity for obtaining accurate information respecting the annual production of food is now become so great, that every attempt to accomplish so desirable an object is worthy of commendation. It has long been our opinion that the extreme and rapid fluctuations that have taken place in the prices of grain and other productions of the soil, have, in a great measure, arisen from our ignorance of what we do not actually produce in the shape of agricultural wealth. Artful and designing men have taken such advantage of this ignorance, that they have been able to enrich themselves upon the spoils of the nation, and disseminated their delusions throughout the kingdom with the greatest impunity.

"We have often been surprised at the unwillingness, we may almost say the obstinacy, which the English farmer has always shown to a systematic and correct account of his crops, associating with it something of a secret interference of the

government. Nothing can be more ridiculous or absurd than these notions. Speculators deal almost entirely in uncertainties; and, the moment that ignorance is dispelled by the light of truth, their trade is at an end, and transactions assume a natural and steady course. A true account of our annual produce, so far from being an injury to the producer, is, we think, likely to ensure a more steady, if not a higher rate of remuneration."

How important would such information be in the present season, as affording the means of exposing the hollow calculations of the "line and rule" farmers, who ignorantly calculate upon producing the same quantity per acre every year! As is well observed, by the *Banker's Circular*, "we are very careful in taking our decennial account of the people, while we remain in perfect ignorance of what we produce for them to eat." We are utterly at a loss to account for the want of energy displayed by the government and the legislature upon this subject. Is it possible that as landowners they are afraid of the information it would give them, lest the smallness of the produce in many cases might show in disagreeable contrast with the largeness of the rent? At all events we are well satisfied that in by far the greater majority of instances the tenant farmers, with prices present and in prospect, need be under no apprehension of letting their landlords or the public generally into an insight of the aggregate value of their produce, unless, indeed, it be from a sense of shame and mortification at being engaged in a pursuit so uncertain and unremunerative in its results. We have always referred to the *Bankers' Circular* as a valuable authority upon the state of the crops in each year, as regards their productiveness in comparison with previous average seasons; and we do so on the present occasion with much satisfaction, because, notwithstanding the change which has taken place in the conduct of that publication, we are enabled to place before our readers a copious extract from an article upon the subject by the late experienced and talented editor. The following observations are contained in an article which appeared in the *Circular* on Friday Sept. 20:

"In that part of the country where the wheat crop proves less deficient than in some other sections, the ear is not properly filled; in a large proportion of the sets a blight struck one row, so that you will find only two or three grains, where, if the ear had been full fed, and supported without blight to maturity, you would have found eight or ten grains. I reckon that from this cause alone—for the effect is general as far as England is concerned—you must make up your mind to a deficiency, compared with the abundant crops of 1844 and 1849, of at least one-sixth. Still, if this had proved the sole drawback, there might have been a yield of wheat not far from an average crop in the aggregate; but unfortunately the blight which struck off suddenly so considerable a proportion of the annual supply was succeeded by diseases which also committed great ravages. These come next under notice.

"There has not been in England a season for twenty years

in which the diseases in the wheat crop were so various, so extensive, or so general. The mildew, the smut, the red-gum, and the mildew, have appeared more or less in most counties of England. The two first may be passed over as being of partial range, and comparatively unimportant in effect. The red gum, or, as it is termed in some counties, the red robin, may be found in all seasons, but in no former year for a long period of years has it ever been so general or so destructive as in the year 1850. Many farmers will tell you that it has destroyed one-half of their wheat crop. Such extreme cases, however, must be rare. There can be no doubt of the extent and of the destructive nature of the disease upon the wheat crop of 1850; I have discovered it in all the midland, western, and eastern counties of England; also in Durham and Northumberland. As far as my observation enables me to determine, it was most rife in Berkshire, Wiltshire, Oxfordshire, and Gloucestershire, and the counties lying between them and the coast counties of the eastern shore. Careless persons are apt to treat the red gum with indifference because it prevails more or less every season; but they will find that in this year it spread to an extent that will make a serious inroad on our annual supply of wheat of domestic growth. I believe it has struck out a quantity greater than that which has been lost by mildew, because it spread much more extensively, and affected nearly all districts—some to a lamentable degree.

"The mildew prevailed in Northamptonshire, Rutlandshire, Leicestershire, Derbyshire, and Nottinghamshire, partially; in the low lands of Cambridge, Lincoln, and East Yorkshire, very extensively. On two lines of railroad through Lincolnshire you could find scarcely a single field of full-cropped wheat without mildew; some of those crops were almost wholly destroyed by this destructive disease. All the way from New Holland, through Grimsby and Boston, to near Peterborough, it was quite melancholy to look over large fields of wheat beaten down flat, of a dark dingy green colour, showing that the corn would never ripen, and would never assume any other hue. The same from Retford, through Lincoln, to near Peterborough. When you reached within about five miles of that city, the wheat crops presented a healthy harvest colour, and one could observe very little of this disease all the way from that point to London; some in Huntingdonshire, while Bedfordshire and Hertfordshire were comparatively free from it. The mildew also prevailed extensively throughout the low marsh lands of the East Riding of Yorkshire; neither were the wolds entirely free from it. The *Times* newspaper still talks about an average crop of wheat; but in its report of the corn trade in Mark-lane on Tuesday last, there is this significant passage: 'The samples on sale from Cambridgeshire and Lincolnshire for delivery by railway, presented a striking contrast to the Essex and Kent, as—although a few were fine and bold—the principal part were shrivelled and light.' To be sure they were, as the writer might have known they must be, if he had examined those counties a month ago. The worst samples from the midland districts will never be sent to the London market for sale.

"These are, consequently, the main facts of the case, so far as the wheat crop of England is concerned: 1. General deficiency arising from blight, and the inability of the injured plant to feed a numerous family of grains. More wide-spread disease of a great variety than has been known in England for more than twenty years.

"Of the wheat crop of Scotland I cannot speak from personal examination. The weather in that country was much more propitious for filling and ripening the corn—as is proved by the harvest operations having commenced nearly at the same

time as in England generally. Reports speak much more encouragingly of the yield of the wheat crop of Scotland, and I am prepared to expect a very different account of the wheat crop of that country from that which I have been compelled to submit above relative to the wheat crop of England exclusively. Here, even in districts where the crops suffered less from disease than in others, there is a general complaint of the yield. On Saturday last I passed through the Isle of Thanet—a singularly favoured locality—where the farmers, one and all that I conversed with, expressed their disappointment at the result of their respective thrashings out. The crops appeared good, and common observers still report them to have been of that character; but the proof in the quantity to carry to market from a given extent of surface, gives a different impression. Not one county of England will yield an average supply from the harvest of 1850; whilst the rich marsh or fen soils of the Eastern counties, on which we have been accustomed to depend for bringing up a moderate crop of wheat to a satisfactory quantity in the aggregate, will this year yield a less quantity of wheat than in any season since 1829.

“My estimate is that the wheat land of Great Britain will in the year 1850 yield a less quantity of sound, useful corn by full five millions of quarters than in the years 1849 and 1844, which were years of abundance. I still retain the opinion frequently expressed in the spring of this year, that there was at harvest time rather an extra quantity of old wheat in the hands of British farmers, although the experience of the last four months has not tended to strengthen my impression of its relative excess. It has not been found in the great wheat-producing districts of Lincolnshire and Cambridgeshire; but it has been found in all the midland, western, and southern counties of England. There is no great quantity of wheat annually produced in Durham; but in no former season have the farmers of that county had so large a supply of old wheat to bring to market after the month of June as in the year 1850. On the whole, therefore, I am convinced that there was a satisfactory quantity of old wheat in store among the farmers at harvest time, rather in excess of what is usually held by them at that season. I could also name millers, not of the first class, who at that period held a quantity of wheat exceeding 10,000 quarters, under the expectation of having to encounter inferior quality and defective supplies from the harvest of 1850.

“For this general stock taking I wish it were in my power to state much of a satisfactory nature concerning the harvests of the near Continental countries. It is said on all hands that the produce of the French wheat harvest disappoints the growers. In the month of August, 1849, I passed through the whole of Belgium, and again in September, 1850. There was some white corn-wheat, oats, and barley ungathered all the way between Cologne and Ostend on the 11th of September, whereas I did not see a single field ungathered throughout Kent on the 14th of September. The Belgium harvest of 1850 was nearly three weeks later than that of 1849; and I am convinced from observation and from inquiry of the same parties in both seasons, that the produce of wheat in that country will prove less by one-sixth or one-fifth than that of 1849. On Wednesday, the 11th of September, I had at Aix-la-Chapelle the advantage of being introduced to M. Liebig, the celebrated chemist. We had much conversation on the subject of the crops, and he reports the wheat crop of Germany in general to be a good average crop; the rye crop a deficient one, though less deficient than was at one time apprehended: the potato crop is extensively diseased, and the tubers will not keep in store. Liebig is an observant, candid, and very sensible person. I know not how far he is accustomed to

harvest examinations, but reliance may be implicitly placed on his report, in proportion to the extent of his survey. I can imagine the wheat crops on the dry porous soils on the high table-land in the vicinity of Frankfort-on-Maine, where he resides, would prove good in a season when an unusual quantity of rain came to promote vegetation.

“I have called this a stock-taking, but it is simply the elements of a comprehensive and satisfactory report. These have to be combined in a general case, so as to enable us to judge with an approximation to accuracy, concerning the probable future range of prices. All men connected with agriculture must desire to know whether, with a bad harvest, we are to have low prices of grain in England. This, if you desire it, must be the subject of another letter. My own impression is, that there is no probability of the prices of wheat falling below their present range, till late in the ensuing spring, at all events. But this great point of a market is one on which no minister of state has ever let in the slightest glimmering of light, so as to enable him to determine what would be the permanent effect of throwing open the British corn markets to all comers. All statesmen have proceeded in utter darkness as to this vital point in the great question. There never was exhibited so rash and fearful a venture without adequate knowledge to guide the adventurers. However, we must deal with things as we find them; and on this point, of the permanent effect on prices from throwing open a market among the richest and densest population in Europe, I propose to submit some observations in another letter, when the information to be collected may be more complete.”

As bearing upon this subject, we have much pleasure in directing attention to a little brochure published by Mr. Mongredien, a corn-factor in *Mark Lane*, and entitled, “Report on the Potato Crop in Ireland for the year 1850.”

Before we refer to the information obtained as regards to the main object, the “Potato Crop,” we submit an extract on the subject of the grain crops:—

“The following is a summary of the reports on the wheat, oat, and barley crops:—

	Districts.	Districts.	Dist.
Wheat reported deficient in...	62	Oats in 5	Barley in 6
„ fair average in...	14	„ in 19	„ in 24
„ good average in	6	„ in 45	„ in 42
„ abundant in ...	—	„ in 14	„ in 6
„ not reported from	8	„ from 7	„ from 12
	90	90	90

“The deficiency in the wheat crop is reported to be fully 50 per cent. in many localities, and on an average throughout Ireland I estimate that the yield will barely reach three-fifths of last year's crop, as, besides the injury the plant has sustained, there was less sown than in 1849. On the other hand the quality is stated to be decidedly better than that of last season. More foreign wheat will be required by the Irish millers than in 1849; but last year, Irish wheat being of indifferent quality, foreign was largely required immediately after harvest for mixing: whereas, this year, native wheat being of better quality, less foreign will be required at once for mixing, and it will be principally wanted for supplying the deficiency of the home growth at a later period, when Irish wheat becomes scarce and dear.”

The result of the potato crop must necessarily have a great effect in regulating the quantity of foreign

corn required for our consumption, and hence the importance of obtaining accurate information on this subject. Mr. Mongredien has taken much pains in seeking information, and we congratulate him upon having obtained a successful issue for his labours.

He addressed a printed list of queries, of which the subjoined is a copy, to 303 different persons residing in various parts of Ireland, with a request that they would answer them.

1. Has the potato blight appeared in your neighbourhood, and if so, what proportion of the total crop do you consider infected?

2. What is the extent of the injury to the crop this season as compared with the last?

3. Are the tubers affected, or only the leaves and haulm?

4. Do you consider the course of the disease to be, to attack the leaves and haulm first, and then invariably, after a certain time, to extend to the tubers? or does it occasionally infect the former without eventually affecting the latter?

5. Do you consider the wholesome properties of the tubers impaired when dug sound from plants of which the leaves and haulm have been tainted by the disease?

6. Do you consider that sound tubers so taken from diseased plants are likely to rot in the pits?

7. Is it considered that the potato disease, even when confined to the leaves and haulm, materially diminishes the productive power of the plant?

8. How much earlier is the potato crop this season than the last?

9. How much earlier did the potato disease manifest itself this season than the last?

10. Do you consider the disease likely to increase in virulence as the season advances?

11. What proportion does the land under potato cultivation this year bear to the average yearly plant before 1846?

12. How much more land is there under potato cultivation in your neighbourhood this year than last?

13. Do you consider that the greater extent of land planted this year with potatoes will be counterbalanced by the greater probable ravages of the disease, as compared with last year?

14. Do you think it likely that the quantity of potatoes expected to be ultimately saved this year will be greater or smaller than the quantity saved out of the crop of 1849?

15. Is there any or much waste in consequence of potatoes being prematurely pressed on the market in large quantities for fear of their spoiling?

16. What is the present price of potatoes per ton in your district?

17. How long do you calculate the potatoes, saved from this year's crop, will last in sufficient abundance and cheapness to be within the means of the poorer classes?

18. Do you think that the reappearance of the disease this year will deter farmers from henceforward cultivating the potato on a large scale?

19. Do you consider that Ireland would be benefitted by the relinquishment of potato cultivation on a large scale?

20. Is the breadth of land laid out this year in turnips much smaller than last?

21. If so, will not a proportionately increased weight of consumption be thrown on potatoes?

22. What are the prospects of the wheat, oat, and barley crops in your district?

23. Is foreign wheat likely to be much wanted in your locality between this and next harvest?

24. Is the use of Indian meal general with you, and is it liked?

25. What is the present stock of Indian corn in your district?

26. Is the number of recipients of in and out door relief, in your vicinity, greater or smaller than this time last year?

Of the replies received, 163 in number, 49 were from Roman Catholic clergymen, 95 from millers and persons in the corn trade, and 19 from landholders, public functionaries, and others. Mr. Mongredien says—

"The general analysis of the 163 reports furnished me offers the following results:—

67 parties entertain *favourable* opinions of the net produce of the present crop, as compared with that of 1849.

50 parties entertain *unfavourable* opinions of it.

46 parties are either doubtful or think that the net produce will be about the same this year as last.

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"As, however, from each of the larger towns more than one report has been sent me, and the above statement exhibits the opinion of each *individual*, I subjoin an analysis of the opinions emanating from *districts*, averaging the reports, when more than one from the same locality:—

In 31 districts opinion is *favourable* to the net results of the present crop, as compared with that of 1849.

In 34 districts opinion is *unfavourable* to it.

In 25 districts the comparative results are either a matter of doubt or are considered about similar.

90

"In no single instance out of the 90 districts from which reports have been received does it appear that the blight has been escaped. In the great majority of cases the whole of the crop has been attacked, at least in the leaves and haulm. The chief diversity consists in the proportion in which the tubers have been affected.

From 3 places the tubers are reported not to be affected at all.

From 20 " " " to be *slightly* affected.

From 29 " " " to be *partially* affected.

From 20 " " " to be *much* affected.

From 18 " " " to be *all* affected.

"The least favourable accounts on this head are from the counties of Antrim, Donegal, Sligo, Mayo, Galway, and Kerry. The most favourable from Louth, Dublin, Tipperary, Waterford, and Cork."

Again—

"As to how far sound tubers from diseased plants are liable to rot after being pitted, opinions are much divided. Of my 163 correspondents,

35 think there is little or no danger of rot in the pits.

34 think it will take place, but not to a great extent.

71 think that a large proportion of pitted potatoes will be lost by rotting.

And 23 declined giving an opinion.

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He further says:—

"To generalize the above data, I have struck an average of the 146 cases we have before us, and the result is that through-

out Ireland the crop was on the average 16 days earlier, and that the Potato blight set in, on an average, exactly the same number of days sooner, than last year. Several facts tend to confirm the theory to which the above data seem to lead. R. F. Saunders, Esq., of Saunders Grove, Baltinglass (county Wicklow), writes—'I am convinced, from experience, that the disease attacks the crop at a certain stage of its growth. I sowed a field five beds at a time, and continued doing so at intervals of a week. The first sown was first attacked, the next a week after, and so on, week after week, till all were attacked.' A correspondent from Ballinamore is of opinion that the particular period in the plant's growth at which the disease sets in is 'immediately, or very soon, after flowering.' If this were universally true, the time of sowing would probably be a matter of indifference. But there are too many facts and opinions tending the other way, to come to any positive conclusion on the subject. In many cases the early kinds are reported to withstand the disease better than others; and so strong is this opinion with many growers, that some intend planting before winter, placing the set sufficiently deep to be beyond the reach of the frost. We also hear of many cases in which the red potatoes remain uninfected in the tubers, whilst the white in the same locality are infected. In a report from Coolmain (county Monaghan), it is stated that 'about 5 per cent. of all the potatoes planted in February and March, 15 per cent. of those planted in April, and nearly 50 per cent. of all planted after the 1st May, are infected and going to decay.'

"As to the probability of the disease increasing in virulence as the season advances, it is so purely a matter of opinion that unanimity cannot be expected. The following is an abstract of the answers I received to this inquiry:—

76 consider that the disease will increase in virulence,

22 consider that it will not,

13 consider that it will if weather prove wet,

6 consider that it will not if weather prove dry,

32 consider that it may probably to some extent,

And 14 returned no answer on this point.

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"Assuming the accuracy of the estimates (for they can be but estimates) made of the quantity of land under potato cultivation this year, as compared both with 1849 and with the average of the years previous to 1846, we arrive at the following results:—

As compared with last year,

In 3 districts the extent of land is the same.

In 10 " it is 25 per cent. greater this year.

In 21 " it is 33 per cent. "

In 19 " it is 50 per cent. "

In 32 " it is doubly "

In 5 " it is trebly "

"The average for the whole of Ireland gives an increase of potato cultivation, this year, of 109 per cent. (or upwards of double) as compared with 1849.

As compared with the years immediately preceding 1846.

In 19 districts it is 50 per cent. less this year.

In 23 " it is 33 per cent. "

In 19 " it is 25 per cent. "

In 29 " it is about the same.

The average of which scale exhibits an extent of potato cultivation only 24 per cent. smaller than the average before 1846. These results are only approximative, as, besides the fallibility of the reports, the districts taken vary in extent, fertility, and population. It is also to be noticed, that in comparing the breadth of land sown with potatoes with the years preceding

1846, the diminution of the population has been taken into account; so that in stating that in 29 districts the extent is as great, it is not meant that there is the same acreage, but that it is equal, making allowance for the lesser number of persons now depending on the crop.

"The quantity which it is probable may be saved from the present crop to serve for human food must of necessity be a matter of conjecture. The breadth of land planted being fully double that of last year, the produce, were the blight of this season no more malignant than in 1849, would be in the same proportion. The following statement of opinions on this branch of the subject exhibits simply the estimate formed by the parties of the probable effect of the ravages of the disease, between this time and the digging of the crop, in counterbalancing the increased cultivation:—

42 consider that the probable quantity of sound potatoes saved this year will be *much larger* than it was in 1849.

57 consider that it will be *larger*.

16 consider that it will be about the *same*.

36 consider that it will be *smaller*.

12 decline giving an opinion.

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"In the following table, instead of individual opinions, I have recorded the average opinions reported from the various districts:—

From 16 districts the probable crop of sound potatoes is reported as *much larger* than in 1849.

From 30 " it is reported *larger*.

From 16 " it is reported about the *same*.

From 24 " it is reported *smaller*.

From 4 " there is no report.

"It may hence be collected that, on the whole, it is believed that the quantity of potatoes that may ultimately be saved this year for human food will be larger than that saved in 1849. The result is, however, looked for only on the two following conditions:—1st. That the progress of the disease between the present time and the final digging and storing of the crop will not be more rapid or destructive than during the same interval last year. 2nd. That after pitting, as large a proportion will be preserved sound as in 1849."

As regards the probable period the potato will last for food he observes:—

"In making an abstract of the various estimates forwarded to me of the length of time potatoes will last in sufficient abundance and cheapness to be within the reach of the poorer classes, I have taken separately each district from which I have received reports, averaging such reports when more than one has been sent from the same district.

In 6 districts the estimate is, that there will be a cheap and abundant supply for 9 months, commencing from the 1st September.

In 7 districts the estimate is 8 months.

In 2 " the estimate is 7 "

In 11 " the estimate is 6 "

In 14 " the estimate is 5 "

In 17 " the estimate is 4 "

In 9 " the estimate is 3 "

In 5 " the estimate is 2 "

In 3 " the price is stated to be already beyond the reach of the poor.

From 16 " there are no returns under this head.

90

"Taking the average of the above, the period thus assigned

for the duration of the present crop as food for the masses, is a fraction under 5 months. Last year's crop did not, it is calculated, hold out for much more than 4 months as an article of food for the poor; but as, this year, the consumption of the crop commenced two or three weeks earlier, the average date at which the potato will cease to be used by the bulk of the population will probably be nearly the same both years, viz., the end of January. I need not, however, point out how liable such calculations, founded as they are on probabilities, are to errors, owing to the course of events varying from the direction anticipated at the time they are made. All we can do is to reason from the most accurate data which, under the circumstances, we can collect.

"How far 'the re-appearance of the disease this year will deter farmers from henceforward cultivating the potato on a large scale,' is a question on which the utmost diversity of opinion prevails. The opinions which have been communicated to me on this head may be classed as follows:—

50 are to the effect that it *will not*.

6 " " that it will not unless the failure this year should prove much more extensive than is at present anticipated.

57 " " that it *will*.

14 " " that it will if potatoes should not keep well in the pits.

18 " " that some diminution will taken place in the breadth of land devoted to potatoes, but not to any considerable extent.

5 " " that for a year or two less will be planted, but that the cultivation

will, after that, become as extensive as ever.

13 parties decline giving an opinion.

163."

Finally he says—

"On summing up the opinions conveyed to me on the *vexata questio*, 'whether Ireland would be benefited by the relinquishment of potato cultivation on a large scale,' I find the following result:—

54 persons are for the affirmative.

42 " are for the negative.

24 " are for the affirmative, if the potato disease should continue permanently to affect the plant; but think that, if the plant were to recover its pristine vigour and fertility, the cultivation need not be diminished.

30 " incline to the affirmative, provided certain changes which they enumerate take place. These changes are chiefly political, and connected with the landlord question, but partly fiscal and commercial.

13 " declined giving an opinion.

163."

We have extracted largely from Mr. Mongridien's "REPORT," because the subject is important, and we consider the information valuable; a perusal of the whole will, however, amply repay the reader.

HADDINGTON AGRICULTURAL CLUB.

At a monthly meeting held at the Star Inn, Mr. Patterson, Ewingstone, in the chair, the following interesting discussion took place.

The CHAIRMAN said he would not offer any remarks of his own on the subject for discussion, which was, "Is it possible to farm at a profit, if present prices are to be permanent?" But as he considered that it had been proposed by Mr. R. S. Skirving, he would now call on him to address the meeting.

Mr. SCOT SKIRVING said that it was true that this was one of the several subjects he had proposed to the committee for discussion, but it was only an hour or two ago that he knew he was to introduce it. He had prepared no statement, partly because he thought that all were convinced by experience, that farming could *not* be carried on, at a profit, under present circumstances, and partly because he felt convinced that a statement involving, as one upon this subject must, a long array of figures was not fitted for the consideration of an assembly which had no time to examine them; and he doubted if any body of men could make much of an arithmetical calculation upon once hearing it read over. The public had lately been humbugged for

two years by a set of railway figurers who had made books to show any sort of traffic that was desired. So much for calculations. Mr. Hope was to move an amendment to this motion, and he owed it to the straightforwardness of that gentleman that he knew that he was prepared with a statement intended to show that, irrespective of rent, wheat could be produced at a profit at 28s. per quarter. Now, while he reserved his right to reply to Mr. Hope, he would take the liberty of making some comments upon it at present. In the month of October, 1843, Mr. Hope was chairman of a great free trade meeting in Haddington. He exclaimed on that occasion, "Oh, that mine enemy would make a speech!" and, to encourage them so to do, he favoured them with one himself. In this memorable oration he drew a picture of the then present and past state of the East Lothian farmers, which, for gloom and wretchedness, might match with the sad accounts we now read of Irish agricultural misery. Tenant after tenant had farmed, struggled, and failed. Now, he wanted to hear from Mr. Hope why they failed with wheat at 56s., when 28s. was all that was required to produce it? What charm had free trade imparted to make it

easy to farm with produce at 28s. in 1850, when it would not pay in 1843 at 56s.? Had taxes fallen? They had increased. Had poors' rates fallen? They had vastly increased in this country since 1843. True, materials had in some degree fallen, and money wages had also slightly fallen—were these the reasons for so vast a difference? The poor hinds who were paid in grain had, in truth, got greatly reduced wages; but while they grievously lost, the farmer gained not a farthing. But to show what figures might be made to do—to show, in homely phrase, a trick worth two of Mr. Hope's—he would tell them that the great statistical leader of Mr. Hope's party, the *Economist* newspaper came out on the 1st of June with a statement which demonstrates, that on "land of a *medium* quality wheat is produced under, or at least at, 8s. 8d. the quarter, barley at 4s. 7d., oats at 3s. 6d., beans at 4s. 7d., potatoes at 27 lbs. for 1d., and beef at 1d. per pound. This showed what persons who relied on figures could be brought to believe—this showed what was to be expected from the tender mercies of free traders. But, taking Mr. Hope's more modest calculation, and supposing for a moment that it is a true one, just see what a generous man he is to wish to propose farming, with wheat at 28s. per quarter, when it might be 56s. He gives up one half, and throws away 28s. per quarter. He farms 500 Scotch acres, and he says he thinks he ought to grow 11 bolls per acre. That is a loss to his landlady and himself of £7 14s. per acre. The *Economist*, and I fancy most free traders, say, there is as much profit from green and other crops as from wheat; so, for the sake of shortness, we shall suppose his whole farm in wheat. The loss for one year is then £3850, and on a 20 years' lease, without interest, £77,000. What a fortune Mr. Hope must have amassed when he had wheat at 56s.! What a rent he might have paid, and what a good thing he must still have of it, with the margin which exists between present prices and 28s.! Mr. Skirving concluded by moving that "*Farming under present circumstances could not be carried on at a profit with present prices.*"

Mr. HOPE, Fenton Barns, said, that after the pointed manner he had been alluded to by his friend, Mr. Skirving, he would offer no apology for detaining them some time in reply. The figures that Mr. Skirving had offered them in reference to his, Mr. Hope's, farm, were so extravagant that they refuted themselves. Mr. Skirving evidently did not understand the practical working of ordinary farm operations, or he must have known that the cost of production of farm produce mainly depended on its own price; that the actual sum paid in hard cash was comparatively small, the price of seed corn, the hay and oats consumed by the horses, and the food

of the labourers, were the principal items, and it mattered little to the farmer whether these were cheap or dear. When the present subject was proposed by Mr. Skirving to the committee, it was accompanied by a long letter, in which it was more than insinuated that a portion of the club were afraid to entertain it, and though I could perceive little practical bearing it could have (for to such questions I think it is generally our interest to adhere), yet I seconded Mr. Skirving's proposal, in the hope that it might assist to dispel a delusion most industriously circulated, that the expenses of cultivation in Britain are so enormous as entirely to preclude the idea of the British husbandman competing with America, or even with any of the nations of Europe. Nothing, in my opinion can be more erroneous. I believe the principal difference betwixt Britain and other countries consists in the money value of land, or the amount of rent that farmers are willing to pay for its use, and that in no other country is grain brought to market at less cost than here, always, however, excluding rent, which is simply a matter of bargain betwixt two parties, and with which the public have no concern. The question on the card is, can farming be carried on at a profit if present prices should be permanent? Now, what are the expenses of raising agricultural produce, or carrying through a given rotation on an acre, or any other known quantity of land, and wheat is the value of the average returns therefrom? Few questions apparently so simple as this, have been the subject of greater controversy. It is a matter on which you will scarcely find two practical men, who will give you the same replies. If they enter into details, they are especially sure to differ. Yet everybody knows an acre to be but a small and well defined extent of measure; one would think that the general amount of expenses incurred, and the average value of the returns obtained, would be easily ascertained and calculated. But the truth is, both expenses and returns vary on every farm, and on the same farm are never two years exactly alike. Besides, few farmers are disposed to give a *bonâ fide* statement from their books, as to what these are on the average of years, for should a handsome profit be shown, the chances are they would immediately be told that their rent was too low; and were a loss exhibited, the reply would be, either that they paid too much rent, or that they were bad farmers, and did not understand their business. Rent is simply the excess of the value of the produce of land, after deducting all the expenses of cultivation. No land of itself will produce a crop of wheat or anything beyond a scanty herbage; it must first be properly tilled and manured, and have that seed sown of which a crop is wished to be grown. These operations it is the duty of the oc-

cupier or tenant to perform; and though the result is much influenced by the nature of the soil, its situation and climate, as well as by the season being favourable or unfavourable; yet in any given number of years, the amount of produce reaped is mainly dependent upon the management of the person who directs the proceedings. His skill and intelligence are shown by the value of the surplus produce left after paying expenses, or the amount of the fund he may have realized, available for profit or rent. Different individuals take different plans to obtain this surplus; one is content with a small produce, if obtained at a small expense; another calculates, that by a large outlay he will have still larger crops, and by this means an increased fund for profit or rent. I make bold to say, that on the great majority of farms in this country, this latter is the true plan, or the one most likely to succeed if judiciously gone about. The only great objection to it is, that it requires years after years of patient outlay, before the returns become sufficiently remunerative, when the lease is coming to a close, and then few choose to have their farm in high condition, from the more than probability of their being called on to pay rent on their own capital and skill. But whether this is correct or not, I maintain that the different items which enter into and form the bulk of the account of farming expenditure, are themselves mainly dependent on the price of farm produce. If you examine the statements of the Scotch farmers who gave their evidence before the Committee of the House of Commons on agricultural distress in 1836, you will see this at once. It scarcely signifies which of them you take, but I will begin with Mr. Howden, Lawhead, as he is well known, and much respected by you all. He gave in a note of the gross produce and also of the rent and expenses of the farms of Lawhead and Trapain, for the three years 1832 '33 and '34:

	£	s.	d.
The rent and expenses amounted to: .	8,854	6	10
The rent alone was:	3,373	1	3

Which leaves for expenses of cultivation £5,481 5 7

This sum may again be divided under two heads, one payable in money, the other depending on the price of grain. The following items appear to me to be made up of produce raised and consumed on the farm, viz. :—

	£	s.	d.	£	s.	d.
Seed wheat for 423 acres at 1 4 2	£11	2	6			
Do. barley 27 „ 0 14 1½	19	0	4			
Do. oats 300 „ 0 10 0	150	0	0			
Do. beans 150 „ 0 13 9	103	2	9			
Do. potatoes 15 „ 2 0 0	30	0	0			
Do. turnips 225 „ 0 2 3	25	6	3			
Grain payable to binds and consumed by horses	1995	0	0			

Grain payable to farm overseer	£75	0	0
Do. „ shepherd, cattle keepers, and labourers	375	0	0
Expense of keep of riding horse	60	0	0
Food for reapers in harvest	168	15	0
Food for dairy maid and boy	38	0	0
	£3550	6	7

Which leaves for tradesmen, harvest expenses, women workers, taxes, and all other expenses payable in money 1930 19 0

Constituting the total of Mr. Howden's expenses £5481 5 7

The value of the gross produce Mr. Howden states to be £9608 5s. 11½d., and we see from the above that all the payments really made in cash to obtain this large sum only come to £1930 19s., or about 20 per cent. of the whole. In the account of produce, the turnips, potatoes, and grass, are put down at £2340. Part of this would go to maintaining the horses, but the greater part would be converted into beef and mutton, with the sale of which free trade does not materially interfere, as the importation of live stock and cured provisions has never yet exceeded 3 per cent. of the consumption of the country, and is, besides, gradually falling off. In the statement of the income and expenditure, by the late Mr. Bell, of Kidduff, of his farm in Berwickshire, for crop and year 1835, wheat is reckoned at 40s. per quarter, oats at 22s., and barley at 26s.; and the total gross produce is given as amounting to £2333 15s. In the expenses, lime, bone dust, and draining, are charged at £143 7s. 4d., besides £40 a year for keeping up implements, over and above £61 for tradesmen's accounts, the whole expense amounting to £1143 13s. 1d., which taken from the gross produce, leaves £1190 2s. 11d. for rent and profit. Three items alone of the expenses amount to £637 3s. 9d., which are paid in farm produce, viz., seed corn, corn consumed by horses, and wages to yearly servants, so that in this case also the payments in cash are comparatively few.

MR. GEORGE ROBERTSON, a farmer and agent for several estates, residing in Kincardineshire, within six miles of Montrose, gave in a statement of the produce and expenditure of a strong clay land farm, containing 253 imperial acres. The expenditure, including tear and wear of implements and stock, tenant's expenses going to market, and £200 a year for remuneration and interest of capital, amounts to £710 11s. 5d., or about £2 16s. per acre. He gives the total income of the farm, charging wheat at 45s., beans and barley at 30s., and oats at 22s. per qr., at £1204 14s. 1d., which, after deducting expenses and tenant's profits leaves £494 2s. 8d. for rent, being about 39s. per imperial acre

or 59s. per Scots. Mr. Robertson also gives the cost of production where no rent is paid, by which he makes out that wheat can be raised for 28s. 6d. per qr., beans for 17s. 6d., barley for 18s. 6d., and oats for 13s. 6d., hay for 3d. a stone, and potatoes for 4d. a boll.

Mr. HOPE also alluded to the statement of a Linlithgowshire farm, given in by Mr. Oliphant, then M.P. for Perth, and said that the true way to find the actual cost of a quarter of grain was to ascertain the proportionate part it bore to the total produce, and then to divide the actual expenses by this proportional part. By doing so, they would discover that, in many cases, the cost would be less than the sum condescended on by Mr. Robertson. I have surely said enough to convince you that prices are more a question of rent than anything else; once these are settled you will pay more or less rent as the case may be. In my address on the corn laws, published by the League in 1842, I stated that when these laws were repealed, farmers without leases would have no difficulty in making new arrangements with their landlords, that those paying grain rents would not require any alteration; but that tenants with leases paying money rents would be entitled to relief by Act of Parliament, so far as that their money rents should be converted into grain at the average prices of the last five or six years, and be regulated for the future accordingly. I added "Justice demands that this be done, and nothing more." To these opinions I still adhere. Whatever you may think of free trade, it is an accomplished fact, and we have it; you cannot help yourselves. I have no hesitation in asking you to agree to the following as the resolution of this meeting:—viz., "That the profitable carrying out of the system of farming in East Lothian mainly depends on the rent corresponding to the price of produce."

Mr. SKIRVING rose and said, that Mr. Hope's resolution was an entire evasion of the question: he would have no objections to second it himself, but the question to the meeting required to be answered either in the negative or affirmative, so he protested against Mr. Hope's resolution being put as an amendment against his.

Mr. M'WATT stated that he was present at the meeting of the committee when the subject was agreed to, and he understood it was to be discussed in all its bearings.

Mr. HARVEY, Stevenson Mains, thought Mr. Hope's motion quite competent, for however low prices should become, land would always be worth some rent, those who had moderate grain rents did not grumble, though those who paid high money rents did. He seconded Mr. Hope's motion.

Mr. CHRISTIE, Adniston, did not think Mr. Hope's motion the proper one, even though those

who paid grain rents did not complain. What was to be done with those who had laid out several thousand pounds in improving their farms, and at the same time paid a high money rent? When he went to his landlord, he was told that he had no share in repealing these laws, and therefore he could do nothing for them.

Mr. SKIRVING, Tuffness Mains, said he could see no difference in the motions; for his part he would vote for them both, the one after the other.

Mr. CHRISTIE, West Bank, said—I cannot but admire the skilful manner in which Mr. Hope has handled this subject; but it seems to me that he has in a great measure evaded the point at issue, in so far as it concerns the great majority of farmers. We are all aware that corn rents in Britain are the exception and not the rule: but Mr. Hope, instead of giving us an example which might be generally applicable, has instanced a corn rented farm, on which, of course, there is an abatement in the rent equal to the fall in the price of grain. This is a point of great importance, and it materially affects the argument. In order to evince this clearly, let us suppose two farms taken under protection equally good bargains; the one being a corn rent, the other a money rent of £2000, the corn rent on an average of years being the same. It is quite apparent that the farmer who pays the corn rent, now paying about £700 less than formerly, is in a very different position from his neighbour who has the fixed rent of £2000 still to pay; and although a favourable balance may still be shown with the aid of the £700 abatement in rent, matters may be very different when the fixed rent is paid. But there is another part of Mr. Hope's statement not warranted by experience. The crop put down far exceeds an ordinary average. No doubt the season last year in some localities was exceedingly favourable, and the crops consequently very great. But is Mr. Hope safe in calculating upon every succeeding season being equally propitious? Would farmers have been justified in basing their calculations of future crops, on the fine season of 1835? Had they done so, how must they have been disappointed! So Mr. Hope, if he would really show that farming with prices permanently as low as they at present are may still be profitable, he must only calculate on average seasons. But Mr. Hope may say that if the season is unfavourable, prices will rise. But what assurance have we now of this? The season although unfavourable here may be exceedingly propitious abroad; and when we consider what a small fractional part the surface of the British Isle is to the unmeasurable extent of country from whence supplies are now sent us, it is sufficiently obvious that any failure in the crop here would have no great influence in raising the price

of grain over the world. But instead of prices rising, have we not reason to believe that even with average crops, prices will be reduced still more; for, low as our prices are, grain is still pouring in from abroad; and if we examine the prices that were current there in former years—if we take an average of years when there was no disturbing influence either to depress or raise prices above their natural level, we will find that prices abroad are considerably higher than their ordinary average: for example, the average price current in Dantzic for 11 years, from 1831-41, was only 37s. 11d. a quarter, while the present price is upwards of 40s. a quarter; and low as our prices are, merchants can still import wheat from Dantzic with a profit; and we must remember that we are altogether in a different position, now that our ports are open, than when under protection. Formerly, owing to the fluctuating and capricious nature of our demand, it proved but of little consequence to the Polish cultivators, and but little corn was grown, in the expectation of finding its way to this country, for before it could have arrived here our duties might have been prohibitory; but now that we have given them a market where they are sure of getting money for their produce, however small the price may be, they will grow corn for us whether we require it or not; and when we take into account the many advantages they enjoy over us in soil, in climate, and in the cost of labour—when we take into account the peculiar facilities they have for producing corn at little cost, we will find that they can farm with a profit, at a price at which even Mr. Hope may be alarmed. In confirmation of this I find that the price of wheat in Lemberg, the principal corn market in Galicia, was only 15s. per qr. in November, 1838. But it seems to me what we have principally to fear is the low price of labour current abroad. You are aware that a great part of the peasantry of the countries from whence we derive supplies of grain are in a state of serfdom; and calculating the money value of their labour, it scarcely amounts to one-third of what we pay for the same labour. In order to illustrate the evil influence this may have on us, allow me very shortly to allude to the condition of the West India planter, which in many points is analogous to the present position of the British farmer, only they have had a few years' more experience of the disastrous effect of having to compete with others who had cheaper labour at command. You must all have heard of the melancholy condition of their deserted plantations and sugar fields, again passing into the wildness of savage nature, and of the cause of this. That it is owing not to any want of skill or capital or enterprise—not because they were behind their rivals in bringing to their

aid the application of science; but that it is mainly owing to the competition of slave labour, which renders all their efforts to retrieve the sinking state of their affairs unavailing. This country made a noble sacrifice on behalf of the slave; but there has arisen a party in this country, who, provided they can accomplish their own aggrandisement, seem heedless, though it be at the expense of others. Give them their sugar a little cheaper, and it matters not though you thereby give encouragement to slavery. Give them the quartern loaf a penny or a halfpenny cheaper, and it seems of no consequence though thereby the agricultural capital be wasted. It is becoming every day more and more apparent, that if prices continue so low as they are at present, money rent must be reduced, least 30 per cent. But how many proprietors can afford this? To how many would not this be tantamount to an almost total deprivation of income? I will now give you an illustration of the effect of low prices in the profits of a farm. I have taken it from an admirable work on agriculture by Professor Low, and I have selected it because it seems to me to be a fair representation of the profit of farming under protection, when the best system of farming is adopted.

The farm is supposed to contain 500 acres, to consist partly of clay and partly of turnip soil, and to be managed in a five years' rotation thus:—

1st. 100 acres in corn, viz., oats.

2nd. 100 acres in fallow, fallow crops, and tares, viz.,

Acres in turnip	60
Do. summer fallow.....	30
Do. potatoes	5
Do. tares.....	5
	100

3rd. 100 acres in corn, with which we sow clover and rye-grass seeds, viz.,

Acres in barley after turnip	60
Do. wheat after summer fallow, potatoes and tares	40
	100

4th. 100 acres in young grass, viz.,

Acres for hay and green forage..	28
Do. pasture	72
	100

5th. 100 acres in grass in its second year for pasture.

ABSTRACT.

	£	s.	d.
1. Rent and burdens ..	1007	7	0
2. Stock purchased ..	15	0	0
3. Seeds purchased....	64	18	4
4. Manures	88	15	0
5. Labour, &c.	403	16	6

£1579 16 10

2nd. PRODUCE.

There remains to be considered what, on this calculation of expenses, may be the annual return of such a farm. This may be comprehended under two divisions—vegetable produce and live stock.

1st. VEGETABLE PRODUCE.

	Bushels.
100 Acres of oats at 48 bushels per acre ..	4,800
The quantity consumed on the farm is—	
For seed	500
Work horses	1,186½
Saddle horse	91½
Colts, hogs, and poultry ..	60—1,837½
Leaving for sale	2,962½
2,962½ bush. at 2s. 8d. £395 0 0 at	£ s. d.
2s. 3d.	333 5 7½
40 acres wheat at 24 bush. per ac. 960 bushels.	
Deduct for seed 3 bush per acre 120	
	840
840 bush. at 6s. 8d. £280 0 0 at	
4s. 7½d.	194 5 0
60 acres barley at 42 bush. per g. 2,520 bush.	
Deduct for seed 3 bush per acre 180	
	2,340
2,340 bush. at 3s. 8d. £429 0 0 at	
2s. 9¾d.	329 1 3
Net annual return of vegetable produce £1,104	£856 11 10½
	1,104 0 0
Fiars of 1850	856 11 10½
Grain loss	£247 8 1½

2nd. LIVE STOCK.

The produce of the dung after rearing 20 calves may be calculated at 35s. per cow. or	17 10 0
50 pigs may be supposed to be sold or used each year, fed to 7 stones at 3s. 6d. per stone	61 5 0
Poultry	7 10 0
28 year-old steers, after being wintered on turnips, supposed to weigh 65 stones each, at 6s. per stone ..	390 0 0
40 old ewes at 40s.	80 0 0
50 gimmers at 27s.	67 10 0
90 dinmonts at 32s.	144 0 0
Wool 2,148 lbs. at 1s.	107 8 0

ABSTRACT.

Vegetable produce	£875 3 0
Live stock	1,104 0 0
	875 3 0
	£1,979 3 0

If from this gross produce be deducted the expenditure in money £1,579 16 10

The net return to the farmer will be ..	£399 6 2
Loss in live stock	175 0 7
Capital £2,845 13s. Od. Interest on capital at 4 per cent.	113 16 6

Total £536 5 2½

Former profit	399 6 2
Deduct loss	536 5 2½

Loss £136 19 0½

But to conclude. When we consider that farming, even under protection, was not a very remunerating occupation, when the grower had 60s. a quarter for his wheat, it is quite apparent that when it is forced below 40s. a quarter, it cannot be a very profitable business. But, indeed, with many this is not a point of argument. It is a matter of fact—we see it, know it, and feel it. It intrudes itself but too obviously on our observation.

Mr. REID, Drem, contrasted the results of crops 1847 and 1849, all the money he got during the time of high prices for crop 1847 went to pay his landlord; this year he would pay his landlord, and have something left in his pocket; this had made him a free trader.

Mr. WEIR, Brownrigg, urged the propriety of great caution in giving an opinion on this important subject; he proposed the vote be taken this day six months.

Mr. ANDERSON, Blackdykes, said, in the discussion many points had been left out, others had been taken for granted, the want of protection might not be the cause of falling prices, all admitted that the corn crops were good, but turnips had not paid generally, though Mr. Reid's ample remuneration had arisen from a good sale of stock.

Mr. REID denied this; he had only sold eleven cattle well: he was mainly indebted to his good grain crop, and paying his rent thereby.

Mr. ANDERSON.—Well, Mr. Reid's was a happy and a singular case. Mr. Hope and another gentleman treated the subject entirely as if all farms were let on grain rents like Mr. Reid's. This was so far from being the case, that a fixed money rent was the rule and not the exception, and in some parts of this country grain rents were unknown. He wanted to know how Mr. Hope proposed to deal with money rents. Was a legislative enactment to be sought to compel landlords to convert money rents into corn?

Mr. R. S. SKIRVING said, he saw little reason for saying much in reply. With regard to the observations of Mr. Reid, who, he was surprised to hear, had ever been anything but a free trader, he was mistaken if he did not remember to have heard him state that he kept no full farming accounts. Now he (Mr. Skirving) professed to keep correct ones; and he declared that farming land adjoining to Mr. Reid's under exactly similar circumstances, during the last year, he had made a dead loss of £115, without counting a farthing for interest on rent and floating capital. As to Mr. Hope, he had begun by good humouredly remarking that his (Mr. S.'s)

speech was nonsense. Now, though he thought a considerable portion of Mr. Hope's speech very great nonsense, he would not retort the expression as regarded the whole of it. The statistical part might be very clever, but if one man in the room would get up and say he had been able to follow it—to comprehend it—why he was fit to be Chancellor of the Exchequer. Mr. Hope had not replied to a single observation he had made, and he spoke peculiar “nonsense” when he said grain-rented farmers were exempt from the ills of low prices. A corn-rent *protects* certainly, but it does not *save*. But Mr. Hope confessed that rents must fall—fall tremendously—and in that confession the fond prophecies of the free trade leaders, uttered for years in every part of the country, were falsified, and free trade pronounced a failure, which reductions of rent and other things must bolster up. Well might Adam Smith say that “experience was continually contradicting the theories of men.”

Mr. HOPE said, that Mr. Skirving having called on him again to reply to his question, how farmers had failed with the wheat at 56s., when 28s. per qr. was all the cost of production, and to answer how he expected they were to do better with wheat at 40s. He, Mr. Hope, recollected well of having made the speech alluded to by Mr. Skirving. It was when Mr. Cobden and Mr. Bright visited Haddington; at that time he went over all the parishes in the neighbourhood *seriatim*, and stated how many farmers had failed in each, and how many had stood the blast. The reason of their failure was this; for some years previous to 1815, we had constant large importations and famine prices; it was thought this country could not supply itself, and that the legislature, by fixing the figure at which corn could be imported, the price here might be maintained at 80s. per qr. The farmers unfortunately believed in the omnipotence of Parliament, and that it could accomplish impossibilities. Engagements were entered into, and rents agreed to be paid on the faith that 80s. per qr. at least would be obtained for wheat; and they have ever since been farming against a falling market, or with rents assumed at a higher price than ever obtained in average years. In a short time, the cry of agricultural distress was louder than it is now, and with more reason; the fall in price from 80s. per qr. to 40s., being much greater than from 50s. or 56s. to 40s. Those who can remember 1821 or 1822, must recollect the thousands of farmers who were swept off the face of the earth at that period. There were motions in parliament, and committees appointed to inquire into the reason of it. After all, the only thing that could be done was to remove a portion of the coveted protection. In 1828, the parliamentary price of wheat was fixed at

60s. per qr. instead of 80s.; still there was distress in 1835, when prices again fell to below 40s. Though by no means so severe as when 80s. was the fixed price, and in East-Lothian where corn-rents had been entered into to protect the farmer from the violent fluctuations occasioned by fiscal interference with their trade, there was no distress at all—the rent corresponding to the price of produce. In 1842, the parliamentary price of wheat was reduced from 60s. to 56s. per qr., and in February, 1849, the corn laws were utterly abolished; notwithstanding this, and the present low prices, those farmers paying grain rents are not suffering. You have heard what Mr. Reid has said. I can say the same for myself, and I appeal to my friend, Mr. Crawford, Rhodes, whom I see present, if he has not been able to get the two ends to meet. I ask Mr. Deans, Mr. Todd, and others paying grain-rents and farming well, the same question. I challenge them to deny if they have not this year something left over rent and expenses. The whole question is a question of rent in this country. In other districts where the rent was only 10s. or 15s. an acre, other modes of farming might be followed, and an ample profit left, as may be seen from the pamphlets of Mr. Talbot, M.P. for Glamorganshire. For five years previous to Mr. Talbot's introducing the East-Lothian system of farming, he only obtained £110 a year for the first five years; under the new plan his returns averaged £480, and for crop 1849 his returns were £680. Mr. Talbot was in favour of protection, for he actually exhibited a table showing that if he had had protection his returns would have been upwards of £1100, which certainly savours of avarice, all the capital employed by Mr. T. being only £2500. Mr. Christie was afraid of the continental serfs and cheap labour. I advise him to read the notes of a tour by Mr. Slater, of Attleborough, a respectable Norfolk farmer, who thought this country would be ruined by importations of corn, until he went abroad and saw how matters stood with his own eyes. He was offered land at Keiff, in Russia, at 4s. an acre, and as many serfs as he liked for £7 or £8 a year, boarding themselves. He would rather have given an Englishman £21, and made money by it; as, besides standing constantly over them with a whip, they only worked 240 days in a year, the other days being saint days or Sundays. The free trade leaders could defend themselves; but he, Mr. Hope, denied that any alteration had taken place in his sentiments for the last eight or ten years. And he assured them that the time had gone by for adding a penny to the poor man's loaf, to increase the rental of the wealthiest class in Britain.

The CHAIRMAN here put Mr. Skirving's motion to the meeting, when 13 hands were held up for it;

and, on proceeding to put Mr. Hope's amendment Mr. Anderson objected, and moved that, as it was not a negative to Mr. Skirving's, it be not recorded.

Mr. THOMPSON, corn-factor, Edinburgh, begged to second Mr. Anderson's motion.

Considerable excitement prevailed in the meeting, and many members left the room.

Mr. HARVEY moved, and Mr. WRIGHT se-

conded, that Mr. Hope's motion be put to the meeting.

Ultimately a show of hands was taken, when 12 voted for Mr. Anderson's motion, and 11 for Mr. Harvey's.

The CHAIRMAN said, as Mr. Skirving's motion was now the only one before the meeting, he declared it carried; on which Mr. Hope dissented for himself and others.

ON THE MISCHIEF ARISING FROM DRAINING CERTAIN CLAY SOILS TOO DEEPLY.

FROM W. B. WEBSTER,

To J. Hudson, Esq.

DEAR SIR,—In the last volume of the Royal Agricultural Journal (the tenth), in a letter on the advantage of deep drainage, the following appears at p. 498:—I have seen land belonging to the Duke of Wellington at Strathfieldsaye so drained, and upon tenacious clay, as I know from the analysis of it. And with him it has had such good effect that his land steward is intending by degrees to have the whole of the Duke's estates in Hampshire drained to a great depth, never at a less depth than four feet, but in some instances, according to the nature of the soil, a still greater depth."

Having seen all that had been done at Strathfieldsaye, and knowing that, on the retentive subsoils, the deep drains did not act well, but only on certain portions of springy land that had been drained years ago, I at once wrote to the agent, and received the following reply:—

"Reading, 5th March, 1850.

"DEAR SIR,—In reply to your letter of the 18th ult., I beg to say that my father is from home, but I can safely inform you that the statement you allude to as being in the 'Agricultural Journal,' that it was our intention never to put a drain in, less than four feet deep in future on the Strathfieldsaye estate, and by degrees to redrain the estate, is quite incorrect.

"An experiment was made on the clay some few years since with the four feet deep drains at wide intervals, but it is not found to answer so well in this county as the three feet deep drain about 26 or 30 feet apart. An instance has occurred upon the heavy land of some three feet drains having been placed between the four feet deep drains, which is probably what the writer in the journal you allude to might have meant, only he should have said that

it was the intention never to put a drain upon the heavy clay at a greater depth than three feet.

"I am, &c.,

"CHARLES EASTON (for GEO. EASTON).

"W. B. Webster, Esq."

Previous to bringing the subject before the society, I was anxious again to see the land myself, which I have now done, and it only requires a person to pass a day on the estate to be convinced that on the dense clay subsoils not surcharged with under water, three feet drains at moderate distances are much more effectual than the deeper at wide intervals. The following letter from Mr. Easton himself, the present agent, will confirm what I say:—

"Strathfieldsaye, 22nd May, 1850.

"DEAR SIR,—I intended calling on you yesterday, but was prevented. In reply to your letter of the 18th instant, relative to draining, I beg to state that the system I am pursuing on strong retentive soils is cutting a common channel three feet deep from 20 to 30 feet distance from each other, placed before replacing the soil. In porous land I cut the trenches deeper and further apart, according to the nature of the soil, and fill it as before stated. I never allow a pipe of less than 2 inch bore to be used. The deep draining, wide apart (say 60 feet), does not answer so well in the clay or retentive soils as the system we are adopting here, and I find I shall be obliged to put a drain between each of those put in deep and wide apart. I am sorry I was not at home when you called. "I am, &c.,

"GEO. EASTON.

"W. B. Webster, Esq."

You must remember that I am only opposed to deep drains at wide intervals on certain strong clay

subsoils, such as the Weald clay, the Oxford clay, and other extensive clays in the south of England. On these I contend that drains at three feet deep, and closer together, are usually better than four feet drains at wide intervals. Now if any one will take the trouble to go to the tenant farmers on the estates of Sir Robert Peel and others in that neighbourhood, they will find that the deep drains that answer there are in what is called clay in that country, but is on the red sandstone formation, and not to be compared in stiffness with the clays I have mentioned.

In bringing this before the society I do so not with the slightest wish to check the progress of deep drainage on the majority of soils, but only to show that there are retentive clays that it will not answer upon.

I am, &c.,

9, Spring Gardens, Wm. B. WEBSTER.
Dublin, June 25, 1850.

(Note.)

It must be now regarded, not as a wholesome caution, but as an established fact, that there are certain clay formations in the south of England on which deep draining is not unlikely to fail. In porous subsoils drains can hardly be too deep, and, as I have said before, will sometimes, if cut

round or through a field, lay it dry without any under draining at all, exhausting wells a quarter of a mile distant. But clay is merely a relative term in agriculture. A clay in Scotland would be a loam in the south of England. In the south we should call no land a strong clay on which, drain it as you will, you could regularly grow and feed off a turnip crop. Besides, the depth of soil is a material point hitherto overlooked. On the Oxford clay, the strongest of all clays, you may have too feet of good soil, or you may have, as I know to my cost, literally no soil at all. Now, since a good soil may be regarded as absolutely porous, the depth of four feet for a drain, though nominally the same, will be really twice as great in the latter as in the former case. In taking leave of the subject, I must say that while the advocates of deep draining have rendered us most essential service, Mr. Parkes, by bringing it into notice, and another writer recently, by eloquently advocating it in a periodical journal, Mr. Webster has done service also in proving the need of caution upon certain exceptional clays. The discussion has helped to draw attention to this important subject, and it was said to me long since by the late lamented Lord Spencer, that the best thing for draining would be a controversy on the depth at which drains should be cut.

PH. PUSEY.

—Journal R.A.S.

THE MANAGEMENT OF HOPS.—PICKING, DRYING, AND PACKING.

SIR,—Picking the hops is a most essential part in the management of them, and requires great attention, for all good managers are very particular in having it done well; many have them picked almost without any leaves, by which they appear in the sample nearly equal to Farnhams; it is also a great advantage towards the other part of the management, for they are more easy to dry even, and of a better colour, and which is done nearly as cheap to the grower. It is strange, therefore, it is not more generally attended to, for they meet with a more ready sale, and at higher prices. When the pickers are permitted to put many leaves in with the hops, they fill the bushel they are measured with so lightly, that it requires 70 or 80 bushels to weigh a cwt., but when well picked, not more than 60 or 70, so that the difference in the price paid for picking is seldom equal to that which is gained in the weight.

There is great injury done to the hop ground in beginning to pick them before they are ripe and the sap done circulating, for whenever that has been done, juices run out of the bines when cut, which is called "bleeding," and where that is seen the spring shoot comes weak the succeeding year, and they seldom produce well. It is proved satisfactorily that when they are picked before

they are ripe, the injury done to them is very great. By the manner most of the gardens are picked, which is in drifts, the bins are set in to pick about 10 or 12 hills square, and which is continued through the garden, and it is invariably seen that those cut before they are ripe, and the bines bleed, is shown by their coming very weak the next year, and the next drift picked a few days after it, is a little better, and the third a little better still, and so on through every drift, until they arrive at maturity. The cause of this is easily accounted for, viz., neither the bine or root is arrived at maturity, and by examining the roots we find their tips turned black, and die as far back as they are brought to the extent of their growth, for the roots of plants are encouraged in their growth as much by the atmospheric air and the sun acting on the lungs of the plant, as the plant is fed by the root from the soil; therefore by destroying the circulation of sap between them has the same effect on the root as on the bine, only the earth preserves the root as far as it is brought to a state of perfection to bring forth again.

When the hops are picked, they are laid on the kilns, moderately warm, and if quite dry when laid on the hair, keep a small fire of charcoal till there is a little moisture at the bottom near the hair; this being ascertained, put

some brimstone on the fire, and continue it until the hops are clear from sweet, and when it is gone off continue the charcoal fire for four hours, which will give them great lustre, and the sample will be more lively than by any other drying. After the charcoal fire dry them off in the usual way with Welsh coal; but if the hops are wet when laid on the hair, the brimstone must be used immediately. When they are taken from the kiln, lay them in a round lump, that they may become more even, for they will continue warm a considerable time, and which will improve those not quite dried at the strig, and coat those that are thin. After they have laid a sufficient time, take them into the cooling-room or stowage; great care should be taken not to move them but as little as possible, that the leaf of the hops is not broken, as they are greatly injured in the appearance of the sample by numerous attempts to lift them until they are sufficiently cool and soft. There is a delusion practised upon the planters by the buyers, that hops picked hot off the kilns come better to the nose. The fact is, that before the smell of the fire is gone out of them they have no smell of the hop, and the very richest and best growths managed so are sold much under their value. This has been the cause of many of the best growths being sold much under their value for sixty years. When they are in a state that the leaf will bear to be sifted without breaking it, as soon as this is ascertained procure small sieves, a few inches larger in diameter than those used for caving corn in the barn, the bottom made of wicker, or larger wire than is usual for barn sieves, and if made of wicker, the round side of the splints upwards, so that the sharp edges do not break the leaf of the hop. The openings in the bottom to be 5-8ths of an inch, but if the hops are very large a little more, but if small not quite so much, and by putting a peg in the wall, about two feet long, for the fore-edge of the sieve to work upon, the thin leaves that are off the strigs will run through and the whole hops will remain, and by pressing the sieve against the wall, on the peg, the whole hops may be broken by rubbing them with the palm of the hands against the bottom; the leaf will be taken off the strigs, which will be taken out of the sieve, and if they are not sufficiently dried, those that will not go through must be taken back and re-dried. This will regulate the sample, that when they are sent to market they may not be considered stock dried.

That the usefulness of this part of the management may be understood, for at the first sight of it those who have not made the trial cannot possibly conceive the great advantage it is to the planters, viz., the use of the small sieve, for when hops are dried there is always some not cured at the core, and which is generally understood that the kilns dry uneven, or those slack dried have lain at the top, and not near the hair. This I admit to be true in some instances, but it is not the only reason, for there is a great difference in the quality and thickness of them; for the best quality are thick in the leaf, and more firmly fixed on the strig, and the thin and chaffy

unripe ones soon dry, and by the usual mode of management, viz., sifting them through a large sieve, and taking out those not broken, all the good and thick hops are taken out, and only the thin ones packed for sale; and the best in quality are re-dried and beat about until they are unsaleable. I would therefore strongly recommend planters to make a fair trial of the method, and as the hops are reclining through the sieve, to take particular notice of the lustre of them that are broken from the strig. This simple thing I have found will make them worth 5 per cent. more; the samples draw better, and the leaf thicker, by those from the best quality, and they will also keep better, and worth more to the consumer: the additional expense is but trifling, for two men, each with a small sieve, will take them from the heap, and sift as fast as one man can tread, if he does it in a proper manner.

In mouldy years, the planters as well as the consumers will find much benefit by taking out the mould after the hops are dried. This is a simple process, and but little expense in comparison with the advantage. I have known mouldy hops that were sold at £4 per cwt., when those grown in the same ground fetched £10 when the mould was taken out. The process is this:—When the hops have been taken off the kiln a sufficient time to pack (without breaking the leaf by treading) get a pair of barn sweeps, and put up in a sufficient-sized room to clean them in; and get a square sieve made (the bottom the same as before mentioned), 4 feet 6 inches long, and 2 feet 6 inches wide: hang it up before the sweeps by 4 cords, a proper height for men to reach the bottom of it, and a man at each end of it will sift them, by rubbing them through, and take out the strigs—a strong wind being kept up by the sweeps during the time. The result will be this:—The mould or buds, with the seed, will fall under the sieve, and the green leaves just at the outer edge of the sieve, but the whole of the hops are blown beyond them. In order that there should be as little loss in weight as possible, the mould is sifted in a small sieve, of a fine mesh like a stable chaff-sieve, and the seed put into the hops again; the mould taken out is of but little weight when the seed is taken from them. The green leaves that fall under the outer edge of the sieve are generally kept in the hops, but if they are much affected, there are as many leaves picked with them as with sound hops; and in this case I have sometimes taken part of them out—this is done by sifting them in an oat or barley sieve; the leaf of the hops will go through, and but few of the green ones. This process requires one man to turn the sweeps, two to sift, one to separate them as they are sifted, and a boy. About four or five extra men will clean from one to two tons a-day, according to the quantity of the mould in them. There is no loss in weight, for the buds are useless when the seed is taken from them.

Yours truly,

Mid-Kent.

CARLEN.

—Weald of Kent Mail.

CLYST FARMERS' CLUB.—LECTURE ON IRRIGATION.

A lecture on the above subject was delivered by Mr. Pratt, to the members of this Association, at Lindsey's Globe Inn, Woodbury, at the last meeting of this club. In the absence of Sir Trayton Drake, Dr. Brent presided. There were present, Messrs. Pratt, Shiles, Warren, Ayshford, Harbottle, Franklyn, Bennett, the Rev. W. W. Bagnell, (the secretary) and other members.

The CHAIRMAN said that he was about to introduce Mr. Pratt, who would, no doubt, deliver to them a very able lecture on the important subject of irrigation. Devonshire was noted for its water meadows; and the interest on the subject of irrigation had been enhanced by the Royal Agricultural Society having at their late meeting in Exeter expressed a wish that the members should visit the water meadows at Killerton and Barton, and which had given great satisfaction.

Mr. PRATT, after an appropriate introduction on the importance of the subject of irrigation, said that it was well known that the most fertile soils were the valleys. Lands on more elevated situations had been always undergoing constant waste; and every shower, and especially every thunder-storm, washed away vast quantities of the soil, and deposited it in the valleys beneath, and hence the cause of the fertility; much of the soil, however, thus washed away from the hills would be carried down into the main rivers or into the sea, and be lost to the hill and valley, unless proper artificial means were employed to secure it. The object of his lecture would, therefore, be to show the best method of distributing water over the land in such a manner so that the grass might absorb as much of the sediment contained in it as possible, and thus prevent its being carried off into the sea. As the causes of the fertilising effect of irrigation on grass had not often been explained, he would take that opportunity of alluding to it. According to Liebig, ammonia was the last product of the putrefaction of animal bodies; and nitric acid or nitrogen was produced from the decay of ammonia. This nitrogen of putrefied animals was contained in the atmosphere as ammonia in a gaseous form. Being extremely soluble in water, it could not long remain in the atmosphere, and every shower of rain must effect its condensation and convey it to the surface of the earth. A thunder storm, after a protracted drought, conveyed the largest quantity of ammonia to the earth at one time, and even in summer, therefore, he would advise the irrigation of land whenever there were heavy rains—provided it did not interfere with the

mowing grass or hay. All plants of the grass kind require silicate of potash. This was conveyed to the soil, or rendered soluble in it, by irrigation. The reeds and species of cane, containing such large quantities of siliceous earth, or silicate of potash, thrive luxuriantly in marshes, and argillaceous soils, rich in potash; and in ditches or streamlets where the change of water renewed constantly the supply of dissolved silica. To obtain good crops, they must replace in the soil the ingredients which have been abstracted by the crop (Hear, hear). The amount of silicate of potash removed from a meadow in the form of hay was very considerable; and it would be observed, from what he had previously stated, that that ingredient was restored to it again by irrigation. Valleys of a clayey formation would be much improved by irrigation; for as all the sediment deposited on them by floods were the lightest and most siliceous portions of the soils from whence they had been taken, of course a most beneficial alteration in the permanent clay would be thus made. The low prices now obtained for the produce of tillage land should induce them to turn their attention more particularly to the extension of their pasture and water meadows. Let them be occupied in fattening cattle, instead of growing rusty corn (Hear, hear, and laughter). They would be far more profitably managed in that way than by arable culture; and to carry out the system with the greatest advantage, the whole valley should be devoted to it from one end to the other; for tillage fields, situated in the middle of an irrigated valley, were a great obstruction to its successful irrigation, besides being of less value to the owner and occupier. How often did they hear of turnips and other crops having been carried away, or damaged by floods, as was the case last year on the banks of the Otter! The soil was of course much more likely to be carried away by inundations, when turned up by the plough, than when laid down in permanent grass. The banks of the river should be sloped gradually down to the edge of the water, and thus the border exposed to the washing of the stream would be employed in producing grass—thus rendering it more compact, and consequently far more capable of withstanding the action of floods, than the perpendicular and uneven sides of naked soils now so often found adjoining rivers. Cattle would also have a greater facility afforded them for drinking. As valleys were warmer than hills, and from their lowness of situation less exposed to the weather, they did not require the shelter necessary for

a hill—which, however, was far too abundantly supplied in the shape of hedges and trees, to the exclusion of the sun and air (which was more needed in a valley than anywhere else); the drying of hay being thus retarded, irrigation obstructed, and an asylum afforded for moles and other kinds of injurious vermin. He would, therefore, with the exception of a few single trees, left in favourable situations as a shade for cattle, recommend the total demolition of every hedge and tree throughout the valley. It was absolutely necessary that all stagnant water should be removed by drainage, that the surface or irrigating water might have free scope for filtering through the soil. If the irrigating water be allowed to run over and mix with water stagnant in the soil, if possible, it caused it to be ten times wetter than before. But, on the contrary, should even the most tenacious clays be drained, irrigation would be rendered less adhesive; because from the capillary attraction of the drains, the surface water was continually filtering through the soil into them, and opening pores and channels for the free ingress of the atmospheric gases, which dissolve the clay. From some drains which he (the lecturer) had dug in one of his watered meadows last spring, he had derived more benefit than any other drainage he had ever effected—the crop of hay in the drained spots having been more than doubled. Supposing the valley to be drained of its stagnant water—the hedges and trees removed, and a fence of wood or iron substituted—he would proceed to explain what appeared to him to be the best mode of irrigating it. The portion of the valley devoted to that purpose must depend on its formation, and also on the size of the stream, [The lecturer exhibited a sketch of his plan of irrigation, which consisted of a main, with branch canals, in the shape and form of a V.] By the irrigating canal, the water was conveyed out from the natural channel over the land, and its incline must be regulated according to the quantity of water. Should the stream be small, it might be cut nearly level, or with a very slight fall, and gradually diminished in size as it increased in distance from the flood gates. As the water progressed down the valley, there would of course be a greater quantity—and therefore, each succeeding canal must gradually increase in size, relative to the increased body of water; the incline must also be more, or too much water would flow out at its commencement. This was further prevented by the raising of a bank on the watering side of the larger canals, continuing from the flood gates to some distance: and as the quantity of water lessened, so should the size of the bank. This bank would be found especially necessary in case of high floods, which were at all times most valuable—owing to

their containing the greatest quantity of sediment. But when the flood receded, the water would be prevented from flowing out where the bank was situate. This might be rectified by a small dent being cut through it, and communicating with the small gutter, which would irrigate when the water was low. These canals would thus disperse the water evenly over the land—and should it acquire any irregularity from the unevenness in the surface of the land, it was again rectified by the succeeding canal. But in particular cases, such as the occurrence of small undulations, the water might be carried over the brow by means of a gutter cut exactly in its centre, and too large a quantity prevented from going down the hollows, by means of a bank made across them. The use, at different stages, of the flood gates was obvious—for they directed the water from its course down the old channel, and regulated the supply to each piece of land marked out by the canals; and whenever it was necessary to dry the meads, they were taken out, and the water was then allowed to flow down its old natural course. To regulate correctly the incline of each canal, it was indispensable that an accurate knowledge should be obtained of the quantity of water that flowed down the valley at maximum and minimum floods. (Hear, hear.) The watering side of these canals should also be sloped, thus allowing the grass opportunity of growing almost into the bottom; the other bank, being left perpendicular, would, with the addition of about two rails, be sufficient for the fence and division of the land. All the canals and gutters should be cleaned out once a year, as there would always be a quantity of sediment deposited in them by the floods—and probably, the most favourable time for that operation would be the present month of September. The soil taken from them could be removed to the arable land adjoining. He would prefer leaving the edges of all the smaller gutters square, and those of the larger ones sloping. Another important thing to be attended to, was the keeping of the mouths of drains clear from all mud or sediment that might collect around them. By this constant and successive distribution of the water over the land, the grass would extract most of the sediment contained in it, and thus a clear stream would flow into the ocean instead of a muddy one. He was aware that his system was liable to objections. One was, the obstacles which were likely to be raised by the different owners possessing property in the same valley: but he would assume that the disputes between individuals would hardly be allowed to prevent the accomplishment of a plan, the adoption of which would result in the advantage of all. A well irrigated meadow would produce a large quantity of grass as early as March—a period

when it is much needed for stock—as there often occurred in that and the succeeding months, an interval when the winter roots were all consumed, and the upland grass had not commenced growing. Among other advantages to be enumerated as desirable from a thorough irrigation of valleys, was the tendency it had to lessen the force and suddenness of inundations from large rivers, because the flood, instead of rushing directly down its old course into the main river, was occupied in irrigating the valley; and its force and suddenness were therefore broken. Probably, if every stream and rivulet which filled the Otter at the time of the great flood last year had been employed in this manner, Ottery bridge would not have been washed away. He could not close these remarks on valley irrigation without noticing the unfair and objectionable way in which most farms were divided. Nearly half of some farms consisted of watered meadow, whilst others adjoining perhaps had none at all. One farmer occupied all the hill, whilst the other occupied all the valley. The latter had his grazing bullocks, his meadow hay, and an abundance of grass early in the spring; whilst the former had only his store of roots to depend on for the subsistence of stock, oftentimes down to the middle of May. The fair arrangement would be to give every farm a relative proportion of watered meadow to the arable land. The lecturer then elucidated two other points, viz., “Irrigation by Liquid Manure from the Farm Yard,” and “The Sewerage Manure of Towns.” With regard to the first, he contended that the tank and liquid manure cart, so generally commended in counties where the land was more level than in Devonshire, was not so available for the distribution of farm-yard manure, as by means of the plan which he recommended. A greater quantity of rain fell on mountains than on level land, and the superabundance of water thus obtained could generally be brought to mix with the liquid manure immediately after it had left the farm yard—and being thus mixed very little manure would be thus wasted, as it was rapidly carried along the gutter and over the surface of the land. This was a much cheaper process than by the liquid-manure cart. He then remarked, that from the often badly chosen sites of their farm buildings, a tank was absolutely necessary—for it was often the case that the lowest and naturally most fertile parts of the farm were occupied by the farm buildings—and therefore the tank and liquid cart was the only way in which the liquid manure could be conveyed over the land; but in numerous instances there were no tank or manure carts, and the whole of the liquid manure was consequently washed clear off into the river or ocean, which was a waste greatly to be deplored. He therefore recommended that

in all future erections of farm buildings they should be built on the higher and poorer lands, and then it would have the full benefit of the liquid manure, instead of the fertile valley. He also recommended the construction of either a simple puddle-clay reservoir or tank in the lowest part of the yard, for the reception of the liquid, previous to its distribution over the land—for, should a gutter be employed for that purpose, the supply would be too small for constant irrigation, unless it was joined by another stream of water; and it would be therefore necessary for it to accumulate for some time in the reservoir, until a sufficient body should be obtained to flow out rapidly over the land—because, if the course of the liquid be slow, much would evaporate, and be lost in its progress through the gutter. This might be obviated in some measure by puddling the bottom of the gutter with clay, or paving it with tile. If the valley below the farm yard were irrigated in the manner he had described, all the liquid manure flowing into it would be again and again distributed over the land, and thus be wholly absorbed by the vegetation before it could reach the main river or sea. The lecturer then referred to the last point—“The Sewage Manures of Towns.” He lamented the waste of manures, which constantly occurred, from the low situations of towns and cities in this country; and remarked that if they could, by a stroke of legerdemain, remove the densely-populated masses of dwellings from the fertile valleys to the top of the surrounding hills, great good would accrue, to the poor especially. In their own locality there was room for vast improvements. He then concluded his able practical lecture with the following suggestion on this point:—“I allude to the sewage of the city of Exeter and the towns of Topsham and Exmouth; for besides the total waste of the manure, it operates most prejudicially on the health of the inhabitants, especially in the two latter towns, because they are adjoining and facing a mass of mud, which retains all the vile fluids carried out on it by the sewers, and thereby causing an everlasting nuisance. Now could we but raise a mass of vegetation on this mud, it would nullify all the bad effects above-mentioned; because all the impure gases now escaping would be absorbed by the vegetation, which again emits oxygen, and thereby supplying us with wholesome air to breathe. The way to carry this proposed remedy into effect would be to convert the present broad and shallow estuary of the Exe into a vast irrigated meadow, by confining the limits of the river to a narrower space by means of a bank constructed from the east boundary of the Exe, at Topsham, down the river to the ‘Point’ at Exmouth. This would also improve the navigation of the river, by deepening its channel; because the same body of water, when

confined to a smaller space than accustomed to, will have greater force for clearing out the bottom. This bank would also admirably answer the purpose of a railway, and thus open two sources of profit. Taking the present rental of the marsh at Exmouth (formerly reclaimed from the river), as a criterion to judge of the value of the proposed one, it would be a profitable speculation, the rent being upwards of £4 per acre. Thus all the sewage of Exeter, Topsham, and Exmouth, together with all the wash of the adjacent country, being constantly flowing over and irrigating this marsh, must render it, in time, one of the most fertile spots in the kingdom—perhaps equal to the land around Edinburgh—forming, at the same time, a railway communication for the surrounding towns, and conducing materially to the health and comfort of their inhabitants.”

Mr. HARBOTTLE asked if the lecturer's plan was applicable both for winter and summer—whether with the fall of rain it would not be necessary at certain seasons of the year, and whether the canals were made to overflow or not?

Mr. PRATT replied that the extra supply of rain would be beneficial, and by a perfect system of canal cutting they would naturally overflow, which could be very well regulated by the flood gates. He referred to his sketch of the plan to further elucidate this.

In reply to Mr. Shiles,

Mr. PRATT stated that the water ought not to be continued on the land after the sediment had settled down; but that after a few days the water should be drawn off, and the land allowed to dry, or it would become too much saturated. Upon land where there were warm springs, the strata through which they flowed made it very fertile, and was of great advantage to the land. He then referred to the natural indications of fertilizing water. Where the pebbles were of a dark colour, and upon which weeds grew, that was the most valuable water for the land.

Mr. SHILES referred to what was called “bed catching.” He had seen wonderful effects result from this system. He had seen bogs reclaimed, and by warm springs were made the most productive meadow land. On this system, instead of the water being carried through the canals, it was made a surface irrigation, the whole of the level being formed into beds; the middle being higher was the cause of draining, and keeping the land dry as well: it then ran on a dead level a short distance to another bed, when it made a sudden dip, and so forth. By this system, he had seen grass six inches high in the scarcest seasons. He did not think Mr. Pratt's system could invariably be carried out on a quick sand soil.

Mr. PRATT approved of the bed system, where

the whole of the valley could be irrigated, but he thought a system such as he advocated was much better where the whole of the valley could not be watered. The sandy shaky land arose from the fact of there being so much water there, the soil being quite in a floating state. In some parts of Scotland and the fens, where such land as this had been drained, it had settled down, and made a firm pasturage; but the difficulty was how to drain it.

Mr. SHILES referred to Colipriest meadow, in the neighbourhood of Tiverton, where the bed system had been carried out with great success.

Mr. WARREN said that as soon as the flood water began to settle down, he was for drawing it off, as the grass was improved thereby. If the water was left too long, a rank grass grew up. He also believed that if too much water was left on the land, it did great mischief. The extra water from floods ought to be let off by the flood gates. Mr. Warren then referred to the ancient mode of washing the dung to get out all the “nasty black stuff” from it, and then it was left to rot. By this means the best part of the manure was lost. Farm yards in the valleys were, he thought, desirable for the cattle and the orchard, but a little elevation was preferable. With regard to saving the sewage, in seven years' time he believed the advantage of it would be better known and appreciated, and from certain plans which might be adopted it would probably come out as guano or manures of that kind. In reference to enclosing the land near the banks of rivers, and irrigating it to make it productive, he alluded to a piece of land that had been enclosed at the Bowling Green, Topsham, by Mr. Francis Davey. That was once believed to be a fortune from its productiveness, but there were some doubts about that now.

Mr. PRATT again referred to his plan. He considered that in flood times the flood gates would be found very advantageous in equalizing the quantity of water.

Mr. HARBOTTLE then referred to the number of trees in Devonshire, which greatly injured the land. They shut out the sun and air, and the roots spread to a great distance. These roots took away a large portion of the nutriment which ought to go to the soil for more profitable purposes. He had taken upwards of two cart loads of roots from a field of three-quarters of an acre, and some of them were as large as a man's thigh.

Mr. SHILES concurred in these remarks, but said that the tenants had lost no opportunity to make it known to the landlords. In some cases they had responded, but in others, he regretted to say, they had not. It was a landlord's, and not, properly speaking, a tenant's question.

Mr. WARREN said that within ten miles of

Exeter, the landlords were pulling down the old timber, and the tenants took care to use the pruning hook so that no young saplings should grow old (laugher).

Mr. FRANKLYN said with reference to the lecturer's plan of irrigation, that he considered the stops of the gutter should be a little lower, to admit of the water passing over the land in small quantities; he thought that so many flood gates would cause the first meadows to have the best water.

Mr. PRATT said that the other meadows would obtain fresh water from the arable land adjoining. He admitted that his was a general plan, which must be developed according to the localities in which it was adopted. It had reference to a large valley, commencing with the head of the stream.

Thanks were then given to Mr. Pratt for his able lecture, and to the Chairman, which were duly acknowledged.

ON SUBSOIL PLOUGHING—HIGHLAND SOCIETY'S DISCUSSION.

SIR,—In your last number there is a letter under the above heading, signed "An Agriculturist," of which fully one-half is devoted to a criticism of the remarks made by me at the meeting alluded to. Indeed, it seems written for no other purpose than to controvert what I said, which would have been an honour, considering the able and intelligent men who supported the same views, had it only been done in a right spirit. But when I am not only charged with "gross misrepresentation," but a motive also is imputed for my doing so, it is a very different matter. It is with difficulty that I condescend to take notice of it, as I have very little regard for anonymous attacks on my publicly-expressed opinions, when accompanied by the wish to give personal offence. But, sir, as it is the first time that I have observed in your most valuable journal anything approaching to uncivil language, I have resolved to break through the proper rule of silent contempt, as it gives me the opportunity, when justifying myself, of beseeching your correspondents not to be influenced by this example of "An Agriculturist," but to go on as they have hitherto done, stating their own opinions and practices frankly and fearlessly, and at the same time continuing to exercise that charity which thinketh no evil towards all who differ from them. I believe, Mr. Editor, all your readers are deeply interested in whatever tends to agricultural improvement; and if any amongst them hesitate to adopt plans which some think would put money into their pockets, it can only arise from their want of knowledge, or from the matter not having been properly placed before them. Could I convert my sovereign into a guinea, neither pride, passion, nor self-conceit should stand in the way. Were agriculturists generally so stupid as to reject any improvement from motives so discreditable, they would deserve richly all the hard things that have been said of them, even down "to the last calumny of horse-shoe idiots," erroneously put into the mouth of Mr. Cobden.

It is denied that the quotation I made from the pamphlet on deep ploughing is, as I characterized it, "the only experiment mentioned *directly* bearing on the point," and I am asked how I could make that assertion, when, "in the very next paragraph to the one which I quoted, some of the first and most successful experiments are expressly mentioned; the estates named where the effects may be seen, and a new mode of deep ploughing minutely described, which had been found highly beneficial," &c. Notwithstanding this, having again looked at the paragraphs to which attention has been directed, I repeat anew that the quotation I give "is the only experiment mentioned *directly* bearing on the point." It is in these words—"Land of the same quality, ploughed 18 inches deep, produced one-fifth more than that which was ploughed only 12 inches deep. Both these rates are beyond the common depth of field culture, and on the least of them there was an excellent crop in a very unfruitful season. The result strongly shows the utility of deep ploughing." Now here we have a positive statement of an increase of quantity arising from ploughing 18 inches deep instead of 12 inches; and I was right, too, in desiderating further information, as I have every reason to believe that this experiment was made on a field which was cropped with wheat year after year, for if it was one of these wheat crops, and it may have been for anything we are told, I am not at all surprised at the result: the astonishment would have been, if it had been otherwise.

But let us now come to the paragraphs which follow. The first begins by stating, "that the great advantages of deep ploughing are too evident to be denied, and they are demonstrated by the effects of subsoil ploughing." The doings of Mr. Smith at Deanston are then shortly described, and it is stated that he "increased the produce of his land (from 24 to 30 bushels of oats) to nearly three times that quantity," which, after all, only approaches to my own crops without subsoiling. It

then goes on to say, that by this mode of culture in the Carse of Stirling, the colour and texture of strong clays were changed, rendering crops of all kinds, including turnips, most abundant. And also, "there are strong and striking proofs of these, its natural effects, at Deanston, Blackdub, Glenbervie, and wherever *draining* and subsoil ploughing have been properly executed, and followed up with deep cultivation." I do not for one moment deny the improvements here mentioned, but I have my own opinion as to the cause which produced them; neither will I insist on the *very rich manure* so liberally used at Deanston, but I will repeat the searching question so well put by Mr. Scott, of Craiglockhart, at the Highland Society's meeting, and which he called upon the advocates for subsoiling to answer, viz., "What proportion of benefit may have been realized from subsoiling, and what from deep (thorough) *draining*?" For, be it observed, there is not a single word of one part of a field having been more deeply ploughed than another, the rest of the treatment being the same. And this remark applies to the second paragraph also, which simply describes the mode of deep ploughing introduced by the late Mr. Murray, of Polmaise, and it states the result to be, "instead of the unequal growth of the crown and furrow, produces a luxuriant crop equally covering the whole surface," which is just the effect of complete drainage on my own farm, and that of my neighbours, without subsoiling.

Having thus rebutted the charge, I might pass over my alleged motive for the "gross misrepresentation," but it is such a singular one, and when looked into so weak, that I am utterly at a loss to understand the construction of mind that it could influence; though, I must confess, I occasionally meet such individuals, viz., persons who cannot permit others to differ from them on any subject whatever. If "An Agriculturist" is one of these, as I suspect he is, it explains at once the reason of his quoting it, and also of his letter. He asks why did I "step out of the record to make that gross misrepresentation?" There is a reason for every thing. In the 19th p. of the same pamphlet, it is said, "Great authorities from East Lothian, famous for farming, declared before the Agricultural Committee of 1836, that their average depth of ploughing was from 6 to 9 inches; but in a district covered with a thick envelope of earth, and in a very variable climate, it is submitted that depth is not enough. Mr. Hope is one of the 'great authorities,' whose immaculate practice is thus reviewed." Had this last sentence been true, which it is not, so far as I am concerned, and had the phrase "great authorities" been used as a sneer more distinctly than it is, even then I never

would have dreamt of taking offence, much less of deliberately misrepresenting the whole of which it forms a part. But it would have been downright stupidity, setting aside the iniquity of the thing, for me to have misrepresented a book that I knew was in the hands of many who heard me, and when I was aware that the manuscript from which I read was to be printed in the public newspapers. However, I am not one of the "great authorities," "famous for farming," who were examined before the Agricultural Committee of 1836. My father certainly was, but his good name and reputation stand on too firm a basis to be shaken even by an error, if he made one, as to the proper depth of a plough furrow. Whether or not he really gave any opinion on this point I have not at present the means of ascertaining.

It is obvious "An Agriculturist" does not consider either 6 inches or 9 inches that deep cultivation which he considers so essential, but we have not one hint what this is in his opinion—whether it is 1 foot, 2 feet, or 3 feet. I have certainly a right to complain of the use of this indefinite language. I am told I plough too ebb: were I to double the depth, I might, from him, be still liable to the same imputation. Regarding manure, it is certainly usually applied to the superficial extent of the culture; but if you plough it in to the depth of 12 or 18 inches, though it will certainly last longer, it is absolutely impossible, as I have proved, that it can have the same good effect as when placed in more immediate contact with the plant. As to the only field I correctly subsoiled, I will just answer so far that it was thoroughly drained, and that the part subsoiled and what was not have always been treated alike, without any perceptible difference in the result. I throw the *onus* of the proof of the practice being beneficial on the party recommending it; it is not for me to prove a negative. Let Mr. Dickson, or some other advocate for subsoiling, reply to Mr. Finnie, of Swanston, who stated "that not one accredited statement had ever reached his eye, showing the comparative advantages arising from it above a similar piece of ground judiciously and substantially cultivated by the ordinary plough." But even Mr. Dickson is not very clear in his opinion as to its benefits, at least of their being immediate, though he did say that the value was from 20s. to 30s. per acre, and that the "whole cost" was only 10s. per acre, and "I find that I can save the whole of this extra labour in spring," from the easier working of the land for green crops. *But after all this*, he did not intend subsoiling on land of which he had only a 7 years' lease to run, until his lease for 19 years was renewed. Were it not for the purpose of showing the immense number of errors which are crowded into the letter on which

I am commenting, I might have omitted noticing the attempt to thrust a new meaning on the words of the question laid before the meeting, by which the Highland Society is made to consider subsoiling a settled question, and consequently that I, and others who opposed it, had no right to speak, on the assertion that the majority of speakers were in favour of subsoiling, when the parties who addressed the chair were equal in number, and if we take away Mr. Davidson (who thinks as little of subsoiling as I do), though he is an advocate for

deep ploughing, the parties against it would have a majority of one. No wonder that the person who made such mistakes as these, failed to perceive which party gave "rather their own opinions than the result of experience."

I am, Sir, &c.,

GEORGE HOPE.

Fenton Barns, by Drem,

Feb. 11th, 1850.

—North British Agriculturist.

BOG CULTIVATION.

One part of White Moss, near Middleton, to the extent of nearly 200 acres, has been improved, under the superintendence of Mr. James Dixon, now agent to Robert Gregge Hopwood, Esq., of Hopwood. This part of White Moss had been purchased, or leased, by Messrs. Gould and Jones, at whose expense it has been brought into cultivation. It now carries excellent crops of corn, clover, and roots, although the climate is far from what is termed good. The Moss lies at an altitude of about 400 feet above the level of the sea. The drainage is perfect, which is not always the case in moss improvements. The following detail of improvements made upon this moss is from information furnished by Mr. Dixon himself:

"The whole extent improved is divided into fields of from six to eight acres in extent each. The fields are in the form of parallelograms, not more than 70 yards wide, all joining up to suitable roads formed for the purpose. The fields are divided by the means of large open drains. The first operation in improving was the cutting of these divisions or main drains, five feet wide, and from two to three feet deep, thus providing suitable outlets for the water. Drains were then opened across the fields from one main to another, being cut 20 inches wide and 24 inches deep. The whole extent intended to be improved as a first undertaking was gone over in the way herein specified; and by the time that all the cross-drains were cut the mains were in a fit condition for being deepened another foot, but in no case should there be any immoderate haste in performing this work, owing to the pulpy state of the surface. It was found the most judicious method to open the drains at different intervals, getting nearly the depth in one season, and completing or covering up such as were to be under-drains the season following. The cross-drains were cut to the depth of no less than four feet six inches when completed, and the mains as much deeper as the condition of the peat would allow.

"The main drains, as before observed, were left open, forming a division between each field; cross-drains were cut at from five to seven yards distance, laid with sods, and covered up before any attempt was made at further improvement. The mode of cutting these drains was with an implement called a tommy spade. This spade is straight on the shaft, and the operator cuts so that his drain-sides are nearly vertical. The surface sod is taken neatly out to the depth of 12 inches, and laid carefully on one side in order to be a covering for the lowermost spit, this being 18 inches deep, and cut with an implement called a spitting-tool, after which the surface was introduced on the spit, and formed what is understood by the term wedge-and-shoulder drain.

"After draining, the surface was broken up, partly with the plough and partly with the spade. In ploughing, to prevent sinking, the horses are provided with wood pattens attached to their feet, made firm by light iron plates, and fastened by means of a bolt. As a further preventive against sinking, the horses were not allowed to walk on the ridge or in the furrow, but on the undisturbed surface. After ploughing, a heavy roller, with eight or ten circular knives fastened to its cylinder, was drawn with four or five horses over the land. This instrument cuts the tough peat into small pieces. A large harrow was then employed to make a further reduction. Marling, being the next operation, was done by a portable railway, without which peat bogs of any extent cannot be by any means cultivated to advantage.

"The waggons and other machinery required to complete one mile of this sort of railway will cost about £400; and when laid down on a tolerably level line, one horse will draw upon it from three to four tons. Sand was used in connection with marl, in the proportion of one of sand to two of marl; and of the two substances about 200 cubic yards were applied to the acre. Nightsoil and

coal-ashes have been applied as manure, and found to answer much better than others, not only as immediate help to the crops, but also to reduce and decay the live peat to a soil. To prepare the peat ready for cropping required three ploughings and three harrowings, and twice cutting with the roller. These operations, on the average, cost about £3 per acre.

"In breaking-up by the spade, the surface was first turned over with the plough, then spade trenched, with the ploughed furrows laid underneath, as the work proceeded. This operation cost from £4 to £4 10s. per acre. The extra outlay in the cultivation by the spade has been found to be amply repaid in the results of the produce, which have been estimated to be from 10 to 15 per cent. in favour of that implement. The following is an estimate of about the average cost of bringing this moss into cultivation, excluding the cost for making roads, &c., viz. :—

Draining, including mains.	£4	0	0
Marling and sanding 200 cubic yards . .	4	10	0
Manure, night soil, &c., 30 tons	7	10	0
Trenching	4	0	0
	£20	0	0

"Some parts of the improved peat were first planted with potatoes, others sown with Swedish turnips, common turnips, and mangold wurtzel: all in drills. Oats have been produced on the moss in question, averaging full 60 bushels per acre. Also turnips from 26 to 32 inches in diameter, and at the rate of about 20 tons per acre."

A railway has been made from the Manchester and Leeds line right on to this moss, by which manure is conveyed from Oldham and Manchester, and the produce from the moss to any market. Being situated in a manufacturing district, the greatest part of the produce is sold from the land, consisting of hay, corn, straw, and roots, and manure brought in return. Very little stock is kept on the land besides the working horses. The rotation adopted after the moss is brought into a regular system of cultivation is, 1st, oats, after clover; 2nd, potatoes, or other root crops; 3rd, wheat, winter or spring varieties, according to the time of sowing, which is sometimes in the early spring months; 4th, clover, cut twice. The detail of the work is as follows:—The clover root is

ploughed one furrow in the spring, and the oats sown broadcast and harrowed in, and when the new crop is in the second or third leaf, it is rolled.

After harvest the land is ploughed one furrow deep, and left all winter. The spring following it is cross-ploughed, then well harrowed, and gone over with the cultivator and harrow alternately at intervals, until the soil is well pulverised, and the weed roots picked out and burnt. The land is then drawn out in 27-inch ridges with a double mould board plough. Dung is then cast upon the land and put in heaps of from 1 cwt. to 1½ cwt. in each, the heaps being put about 6 yards asunder in every third drill. It is then spread equally in the furrows and the ridges, reversed with the double mould-plough. The mode of management is the same whether for potatoes, turnips, or mangold wurtzel, only the potato sets are laid on the dung before covering up, and the turnip and beet seed are sown above it after it is covered, the ridges being rolled before and after sowing. Mangold wurtzel is sown early in April, afterwards potatoes are planted in that month, and also in May. Swedish turnips are sown from the middle of May to the middle of June.

Different varieties of the common turnip are sown (as soon as time and circumstances will allow) on the remainder of the fallowed land; of course that land on which those crops are sown the latest, receives extra scarifyings and harrowings before sowing.

All these root crops are gone over with the drill cultivator or horse hoes during the growth of the crop, and the plants thinned and kept clean by hand hoeing and weeding. Potato sets are laid down from 9 to 12 inches asunder in the drill, and the best turnip plants left about 12 inches. As these crops are removed from the land in the autumn or winter, the land is ploughed one furrow, if the weather suits, the wheat seed also being sown broadcast and harrowed in. In April following the crop is rolled, then red clover and rye grass sown, and the land bush-harrowed and rolled again. After the wheat is harvested, a tod pressing of night soil and ashes is given as soon as the land and weather will permit, or of guano or soot in the spring following. The quantity of seed oats sown per acre is about 5 bushels, and of wheat 2½ bushels. —Rothwell's Agriculture of Lancashire.

ON THE PROPER QUANTITY OF SEED FOR WHEAT.

BY R. BIRCH WOLFE.

In 1848 I communicated the result of an experiment made by me on thin and thick sowing of wheat, which was published last year in the Jour-

nal of the Royal Agricultural Society; and from the statements I then made, it appeared that seven pecks of seed, drilled at seven inches apart, gave a

produce of nearly a quarter an acre more than six pecks drilled at nine inches, the cultivation and land being equal.

As it was impossible to arrive at any satisfactory conclusion from a single experiment, I made a further trial last year, and having now accurately ascertained the results, I give them, that if thought of any use, they may appear in a future number of the Society's Journal. The land marked out for the experiment consisted of three acres lying together in a field of 16 acres, and divided into four plots of three roods each; the cultivation was exactly alike in each case, and the soil heavy clay in good heart; the seed Spalding wheat. I may add that the whole of my land is formed into *flat* stretches seven feet two inches wide, which are exactly covered by the drill, harrows, and rollers, all made with double shafts, and the horses walk between the stretches.

EXPERIMENT.

Width of drills in inches.	Seed at rate per acre.	Produce in sheaves.	Produce in Grain from the 3 roods.	Produce at rate per acre.	Lbs. per bush.
	Pecks.		Qrs. r. p.	Qrs. r. p.	
9	5	689	4 0 0	5 2 2	62½
6½	7	665	4 0 0	5 2 2	62½
8	6	681	4 0 3	5 3 2	63
Dibbled & dropped by hand at 8 inches.	6	692	4 1 0	5 4 0	61½

It will be seen by the above statement that the produce from each parcel of land was very nearly the same—that which was dibbled failed most in plant, but tillered well, and yielded rather more than the rest, but in proportion as the plant was thin, so was the grain coarse and light.

From the frequent observations that I have made, and judging from both the above experiments, I have come to the conclusion that, taking the average of seasons and all other circumstances into account, there is great risk of loss in drilling wheat in such land as mine, at a distance of more than eight inches, and with less seed than six pecks per acre. In heavy land of average quality, well drained, and in good heart as mine is, the above quantity of seed (six pecks) and intervals (eight inches) will, I think, be found the safest and most productive, at the same time it is very probable that less seed and greater intervals might answer as well or better in lighter land of superior quality, supposing the system of cultivation to be carried out upon the most approved principles.

I have this year acted upon the conclusion I have come to, and drilled all my wheat (about 80 acres) with six pecks of seed, and at eight inches apart, and up to this time I am perfectly satisfied with the promise.

R. BIRCH WOLFE.

Wood Hall, near Newport, Essex, February, 1850.

—Journal R.A.S.

GLEANINGS IN AGRICULTURE.

(Continued.)

68. *Phleum alpinum* (Alpine cat's-tail grass).—This phleum is a grass of no great value, except to the Highland farmer. It is found amidst moss upon the margins of rivulets, on the mountains of Scotland, sometimes from 12 to 14 inches high. Root moderately creeping and tuberous. A perennial, and flowers in July.

69. *Phleum arenarium*, *Phalaris arenaria*, or *Chilochloa arenaria* (Sea cat's-tail grass).—Such are the names by which this interesting little grass is known botanically. It is an inhabitant of several of our sea shores, and yet it is frequently met with far removed from the sea in dry corn-fields, sometimes a foot high, but its general height is only a few inches. It has no claim upon the agriculturist; yet, small and insignificant as it is, we must place it amongst those plants of whose virtues we are ignorant. It is an annual, and in flower in May.

70. *Panicum Crusgalli* or *Echinochloa Crusgalli* (Cock's-foot Panic-grass).—This panic is the largest of the genus found in this country, often attaining the height of three feet; leaves broad, smooth on the outer

side, rough on the inner, and the edges are usually tinted with purple. There is no grass with which we are acquainted that assumes such different characters under cultivation as this grass does. It produces an abundant and luxuriant foliage when cultivated on rich moist soils, and is particularly deserving the attention of the agriculturist. It is an annual, flowering in July.

71. *Digitaria sanguinalis* (Cock's-foot or Finger-grass).—This rare and beautiful grass can never be confounded with any other. It is an annual, flowering in July and August. Sinclair says, at the time of flowering the produce from a sandy soil was 6,806lbs. per acre. Schieber says that this grass is cultivated in Germany for its seeds, which are used as a favourite article of food, boiled with milk and wine whole, in the manner of sago, to which it is preferred. It delights in a rich moist soil, and the seeds should be sown, as soon as they are ripe, in the autumn, thinly, for the stems which lie nearest the ground strike root at every joint, which causes it to spread considerably.

72. *Milium effusum* (Wood Millet-grass).—This is

one of the earliest, and if not the most universal, perhaps as elegant a plant as any of our sylvan grasses; it is, however, remarkable for the lightness of its produce in proportion to its bulk. In covers where game is preserved, this is one of the very best grasses to be sown, as most all birds are fond of its seeds. It appears to thrive best in chalky soils, under large beech trees; and although a true sylvan grass, it will thrive and grow, when sown with others, in exposed situations. The epithet "effusum" is aptly given to this grass, for it produces an abundance of seeds. The foliage, when dry and weathered, has a pleasant faint smell, something like the vernal grass. It is a perennial, flowering in June, and the seed is ripe in August. Sinclair says, at the time of flowering the produce from a light sandy soil was 7,827 lbs. per acre. Every part of this grass is relished by cattle; and the aftermath comes away freely even after the first crop has been allowed to ripen its seeds. The young pheasants devour the seeds greedily.

73. *Milium lendigerium*, *Gastridium australe*, Beard (Yellow Bent-grass).—This grass is found in fields where water has stagnated, especially towards the sea. An annual, flowering in August, from three to twelve inches high; said by some authors to be plentiful in the Isle of Sheppey.

74. *Agrostis setacea* (Bristle-leaved Bent-grass).—This grass is found in dry heathy places, affording provender to close-biting animals, which frequent those places. We have no grass that forms naturally so de-

lightful a turf as this grass. It is a perennial, flowering in July and August.

75. *Aira flexuosa* (Long-leaved Hair-grass).—This is no meadow grass, but a frequenter of high and elevated stations in woods and open places, where it is readily distinguished from its congeners. Leaves, very fine, and about half the length of the straw. It is readily eaten by sheep. A perennial; root fibrous; flowering in July. According to Sinclair, at the time of flowering the produce from a heathy soil incumbent on clay was 10,209 lbs. per acre. The produce of the lattermath was 2,722 lbs. per acre. This aira is much more productive on its natural soil than the *Festuca ovina* (No. 9), but it requires a deeper soil, though not a richer. To those who attempt the improvement of such soils in a secondary manner, this species appears to be the best of those grasses natural to the soils in question, and may form a principal part of a mixture for that purpose.

76. *Sesteria cærulea* or *Cynosurus cæruleus* (Blue Wiregrass).—To the highland farmer this grass affords considerable nourishment to his mountain-fed sheep, which animals are particularly fond of it. But as a low-land grass it is of little value. It is an early grass—flowering in May and June; a perennial; and, according to Sinclair, at the time of flowering the produce from a light sandy soil incumbent on clay was 7,486 lbs. per acre. The produce of the lattermath was 3,403 lbs. per acre.

Millon Abbey.

J. M'INTOSH.

(To be continued.)

DESTRUCTION OF THE WIRE-WORM.

FROM J. M. H. CHARNOCK.

To the Secretary of the Royal Agricultural Society.

DEAR SIR,—Without any purpose of competing for the prize offered by the society, but thinking it possible at the same time that a brief account of a very simple and efficacious plan for the destruction of the wire-worm may either tend to confirm the practical value of some of the essays that may be written on the subject, or by its publication benefit the agricultural community, I beg permission to lay the few necessary particulars before the Journal committee.

That I may not appear to assume what, in this, I have no title to, viz., the merit either in theory or practice of the plan, I must state that it was communicated to me a few days ago by my relation, Mr. Charles Charnock, of Holmfild House, who himself received it from Sir William Cooke. Some few years after his entry on his farm, Mr. C. was complaining, in the presence of Sir William, of the injury his crops had sustained from wire-worm, and lamenting that there was no known way of destroying them. Sir William then informed him that he had heard of and adopted a plan which had proved perfectly effective, and which Mr. C. subsequently followed with the same success.

In lieu of the ordinary top-dressing with rape-dust, apply to the land, and plough or harrow well in five cwt. per acre of rape-cake crushed into lumps of about the size of half-inch ground bones, and the result will be, that the wire-worms will congregate on these lumps of cake, devouring them with such avidity as to become glutted, and perish either from repletion, or from the peculiar properties of

the rape, or from the combined effects of the two. Rape-dust will not answer the purpose, because it presents no surface upon which the worms can fix themselves, and no substance into which they can eat their way. Perceiving that a satisfactory result was being attained in the first field to which the cake was applied, Mr. Charnock took up and examined many of the lumps, and found them full of the defunct and expiring enemy. The practice was, of course, followed throughout the farm where the worm prevailed, until in a year or two the land was perfectly freed, and that without any recurrence of the evil.

Mr. C. has also on several occasions since had recourse to the same means for preserving his carnations (which are very liable to be attacked by the wire-worm), and he has invariably witnessed the same satisfactory result.

The plan is so simple, and apparently so efficacious, that I need not dilate further upon it than to remind those who may be disposed to try it, that whilst they may hope to destroy the worm they will certainly add a rich fertilizer to their land at a reasonable cost.

It should perhaps be mentioned, that the land to which Mr. C. applied the remedy is a dry soil on the magnesian limestone, and I believe Sir W. Cooke's was the same; but I see no reason for supposing that it would not be equally efficacious in other soils. I have the honour to be, sir, yours truly,

J. M. H. CHARNOCK.

York, February 28, 1850.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(From the Morning Chronicle.)

INTELLECTUAL AND MORAL CONDITION OF THE LABOURER IN THE SOUTHERN AND WESTERN COUNTIES.

LETTER XIII.

Before proceeding to state the results of my observations, as regards the moral condition of the labouring poor in the counties which I have visited, it may be well to allude to their intellectual state in the counties of Somerset, Cornwall, Devon, and Dorset.

In dealing with this branch of the subject, in reference to the counties of Bucks, Berks, Oxford, and Wilts, I took occasion to treat it in connection with two classes of persons—the adult labourers and the rising generation of labourers. I shall here follow the same plan; first considering the question in its bearing upon the adult labourer.

I regret to say that in the counties now more immediately in question I found the same degree of ignorance and stolidity prevailing as in those previously considered. Cornwall may, to some extent, be regarded as an exception; both the mining and fishing populations of that county, but particularly the former, generally displaying a degree of intelligence very superior to that possessed or exhibited by the agricultural labourers around them. This is almost exclusively attributable to the peculiar character of their occupations; for the educational facilities which have hitherto been at their command have not been superior to those possessed by their brethren who labour in the fields. Their pursuits are such as to require constant watchfulness, and frequently to call into exercise the reasoning powers. This is especially the case with the miner, who has sometimes to make very nice calculations, which he does in his own rude way, but with wonderful exactness. It is generally upon themselves, and upon their knowledge of their respective crafts, that both fishermen and miners depend for the success of their enterprises and the amount of their gains. This stimulates them to industry, and quickens into activity their mental energies. But the position of the field labourer is little beyond that of a machine, which, in point of capacity, he also too closely resembles. His daily task is assigned him, and he performs it; but the work is merely the work of his hands, and is scarcely ever directed by his mind. There is, consequently, generally speaking, the greatest possible difference in this respect between him and the two classes of men alluded to. They are quick, shrewd, and calculating, whereas he is slow, stolid, and mechanical. The miners and fishermen, too, are generally lively and cheerful, whilst the farm labourers, as a class, are moody, sullen, and morose.

But there is a great difference between mere intelligence and education, in the ordinary sense of

the term. The intelligence possessed by the miners and fishermen is the result merely of the education afforded by the peculiar nature of their occupations. As may be supposed, therefore, their range of intellectual activity does not much transcend the sphere of their labours. The mind which has been quickened into action, in any direction, is, however, more susceptible of improvement than that which has been permitted to lie wholly dormant. So it is with them. They are far more teachable than the rural labourers, although they have not been more taught. They are quicker in apprehension and more retentive of what is communicated to them than is the peasant; but, generally speaking, they are found deplorably ignorant as regards all subjects which lie beyond the line of their daily avocations. On conversing with them, one cannot but regret that so much intellectual power as they possess and exhibit should be left to direct itself into but one channel. A very large proportion of them cannot read, and I venture to say that the great bulk of them cannot write. Many of those who read do so with the utmost difficulty, whilst numbers who write can scarcely aspire to any higher achievement, in this respect, than the scrawling of their own names.

Taking the adult class of agricultural labourers, it is almost impossible to exaggerate the ignorance in which they live and move and have their being. As they work in the fields, the external world has some hold upon them through the medium of their senses; but to all the higher exercises of intellect they are perfect strangers. You cannot address one of them without being at once painfully struck with the intellectual darkness which enshrouds him. There is in general neither speculation in his eyes nor intelligence in his countenance. The whole expression is more that of an animal than of a man. He is wanting, too, in the erect and independent bearing of a man. When you accost him, if he is not insolent—which he seldom is—he is timid and shrinking, his whole manner showing that he feels himself at a distance from you greater than should separate any two classes of men. He is often doubtful when you address, and suspicious when you question him: he is seemingly oppressed with the interview whilst it lasts, and obviously relieved when it is over. These are the traits which I can affirm them to possess as a class, after having come in contact with many hundreds of farm labourers. They belong to a generation for whose intellectual culture little or nothing was done. As a class, they have no amusements beyond the indulgence of sense. In nine cases out of ten, re-

creation is associated in their minds with nothing higher than sensuality. I have frequently asked clergymen and others if they often find the adult peasant reading for his own or others' amusement? The invariable answer is, that such a sight is seldom or never witnessed. In the first place, the great bulk of them cannot read. In the next place, a large proportion of those who can, do so with too much difficulty to admit of the exercise being an amusement to them. Again, few of those who can read with comparative ease have the taste for doing so. It is but justice to them to say that many of those who cannot read have bitterly regretted, in my hearing, their inability to do so. I shall never forget the tone in which an old woman in Cornwall intimated to me what a comfort it would now be to her, could she only read her bible in her lonely hours.

Take the ordinary day labourer on the farm, and viewing him from what point you will, what manner of man do you find him? You are first struck with the anomaly presented by the outward man. In his very dress he seems not to belong to the century in which he lives. The smock-frock was never the garb of active labour, and it certainly but ill befits the labourer of these bustling and competing times. It would be no more in the way in the mine or the factory than it is in the field. Field-work requires a great deal of stooping, and perfect freedom of the limbs. The frock is neither adapted for the one, nor allows of the other. His gait, too, is awkward. The contrast between him and men engaged in other laborious occupations is sufficiently great to force itself upon the most passive observer. He seems to belong to an inferior grade of beings, when compared with the factory operative, the worker in the mines, the fisherman, the artisan, or the stable boy. They are dressed, more or less, in keeping with their work and with the times, and are quick and intelligent in their movements, whereas he is attired in the robe of centuries gone by, and is awkward, cumbrous, and mechanical in his actions. The state of his mind has been already adverted to. Education has advanced him but little beyond the position which he occupied in the days of William the Norman. The farm labourer has scarcely participated at all in the improvement of his brethren. As he was generations gone by, so he is now—a physical scandal, a moral enigma, an intellectual catalectic.

Let it not be said that this picture is too strongly drawn. The subject is one which does not admit of exaggeration. Did space permit, or could any good purpose be served by it, I could adduce instances almost innumerable of the profound ignorance in which this class of British subjects is steeped. There is scarcely a field in the agricultural districts which does not exhibit a living illustration of it. Search any county throughout the south and west, and the examples start up around you in hundreds. I have found it so in all those which I have traversed; from Salisbury to the Lands'-end—from Portland-bill to Oxford; in the vale of the Torridge, and in the vale of Aylesbury; by the Thames, the Severn, the Frome, the Stour, the Exe, the Camel, and the Plym. Where all is bad, it is sometimes difficult

to point out the worst. So it is here. Cornwall may again be separated from the rest, for, even as regards the agricultural labourer, it forms an exception to the other three counties of the group. In that county the labourer is quickened a little into intellectual life, by coming frequently into contact with those whose intelligence is superior to his own. But, even here, education, in its ordinary acceptation, has done as little for the peasantry as in Dorset, Devon, or Somerset. It is, perhaps, in the last-mentioned county that their intellectual gloom is the most rayless and hopeless.

But this has more to do with the past than with the present or the future. The existing generation has grown beyond us, and, as to it, we cannot now rectify the error, even if we would. The question of greatest interest to us, because the only one having a practical bearing, is, what is being done for the education of their offspring and successors?

In inquiring into the nature and extent of the educational machinery at work in the counties in question, I found that, as regards reliable and authentic information, I had to encounter the same difficulty as formerly. No one seemed to know any thing of what was going on in this respect, beyond his own district, and few could furnish me with any very specific detail connected even with their own districts. This parish had one kind of school, that another—this one again had both—and that neither the one nor the other. On this, as on other subjects, people are often apt to be deceived by sounds, and are prevented only by careful inquiry from frequently running off with the most erroneous impressions. Thus, I was informed at Blandford that not only was there an excellent National school there, at which the children in the union were taught, but that all the surrounding parishes were provided with schools. "Have they all National-schools?" I inquired. "No, not exactly that," said my informant. "They have all day-schools, I presume?" I added. "Well," said he, "I am afraid I must say that some of them have only Sunday-schools." And so it is with many parishes in other parts of the county, which we are told are provided with schools. Even in a secular point of view, the Sunday-school is better than no school at all. A few of the children who attend them are taught to read—but only a few, for the attendance is irregular, and the interval of a week which elapses between every two brief lessons affords the child sufficient time for forgetting the little that may have been learnt. Unfortunately even when there are day-schools in the parish, it is only the Sunday-school that the labourer's child can attend. Labour in the fields, for 1s., 1s. 6d., or 2s. a-week, absorbs all his time during the six days of work; and it is only on the seventh that his mind has any chance of receiving the slightest culture. When the child lives wholly with the farmer who employs him, it is only during a fraction of the year that even the Sunday-school is attended. He is kept steadily at work every day in the week, especially during the season when the cattle are housed. It is thus that multitudes of the rising generation are rapidly growing up, and passing without improvement the improvable age. So far as they are concerned,

their inheritance will embrace the ignorance as well as the servitude of their fathers. Reading is of course the only element of secular education taught at the Sunday-schools. You can almost always tell when the education of a child has been confined to these schools. He can sometimes read well, but knows nothing of either writing or arithmetic. In some parishes, where there are no day-schools there is but one Sunday-school; in others there are several Sunday-schools; their circumstances in this respect depending upon the extent and zeal of the different sects which may inhabit them.

One cannot fail to be struck, on examining into this matter, with the newness of the machinery which he finds at work around him. In almost every other parish which you visit you are told by the clergyman that until he established one there was no day-school whatever in the parish. Nor is this the case only where the incumbency has been of long duration. I have been informed of it in numerous instances in which it has only taken place within the last three or four years. Even the very school-houses have, in most cases, a look of yesterday about them. In many of the rural towns particularly—and generally under the shadow of the church—you will find neat, small, and trim Elizabethan-looking buildings, the mortar of which seems yet scarcely dry. Here and there, again, you discover, but generally about the outskirts of the town, equally substantial but less showy erections, appertaining to the British and Foreign School Society. In numerous instances you find both.

I have already had occasion to state how far behind the educational exigencies of the time are many of the teachers of the National-schools. I was sorry to find the same deficiency existing, though not to the same extent, in connection with many of the rival institutions. The best that can be said of some of the National-schools is, that they are enlarged and improved dame-schools. The British and Foreign schools are more generally divided into departments, the women being usually found presiding only over the girls' department. Sometimes they have a third—an infant department—attached to them, where children of both sexes are taught (generally by a woman) up to a certain age, when they are drafted off into the boys' or girls' department, as the case may be. The following may serve as a specimen of some of the teachers even in these schools, in which one generally looks for efficiency in the work of education. The circumstance happened in Cornwall, in a parish in which there was no school but the British and Foreign school, which was attended by many children belonging to the church. I was accompanied to the school by one who took a great interest in promoting the educational system to which it pertained. On entering the boys' department, I found about 120 of them assembled, most of whom were being noisily instructed in geography. At some distance before them was a large map of England, by means of which the teacher was testing their knowledge of localities. Finding the system pursued to be that of permitting all the boys to answer at once, I listened attentively, in order to test their proficiency, to some of the boys

in the back rows, and found that all they did was to make an unmeaning noise every time a question was asked, leaving those who could to answer correctly and distinctly. In the noise of nearly a hundred voices this delinquency was undetected by the master. He shortly afterwards showed me several maps drawn by some of the boys. One of these was a large map of Scotland, which was the conjoint work of two of them. He evidently took great pleasure in showing it as something which reflected great credit alike on master and pupils. On its being unrolled, the first thing my eye lighted upon was an immense arm of the sea, which, commencing at the head of the Dornoch Frith, stretched in a north-westerly direction nearly up to Cape Wrath, almost cutting the county of Sutherland into two nearly equal parts. It was painted so excessively blue that it was impossible to overlook it. I directed the master's attention to the county, and asked if he perceived nothing wrong about it. He said he did not; whereupon I pointed out the blunder to him, telling him that, independently of geographical teaching, my topographical knowledge of the locality enabled me to detect the error, as I had more than once ridden, high and dry, in her Majesty's mail, over the ground which the map had submerged with an arm of the sea several miles wide. He looked confused and annoyed, but said, at last, with great *naïveté*, "I'm sure it was so in the copy."

But, notwithstanding the undoubted improvements which have recently been effected in them, the Parochial Union schools still constitute the most generally defective feature in our educational system. There are few of the unions now which have not in the workhouses the semblance at least of an efficient school. If you enter during school hours, you find all the children in the house attending, under the superintendence of master or mistress—more generally the latter, when the school is a mixed one, or of both when it is divided, as is sometimes the case, into separate departments for boys and girls. The children are all in the paupers' uniform, but are neat and clean in their appearance. The educational appliances with which the school is provided vary in the different unions. There is still a large proportion of them without the means of teaching geography; and many of those now provided with maps have been so so recently that the children have not as yet derived any benefit from them. That which is mainly defective in these schools is the system pursued. It is one of mere education without proper training. When I enter one of these schools, the first thing that is done is to place the copybooks of the children before me, after which I am asked if I would like them to cipher or read to me. But it is chiefly with the general training of the children that I busy myself, and it is this that I find so universally defective. They are taught reading, writing, and a few rules in arithmetic, and sometimes a smattering of geography; but these things are generally taught them in a way which opens up the mind a little, without in the least degree improving the heart. The teachers are too often those who, having failed in other pursuits, take to this occupation as a last resort. Nor, in-

deed, is this to be wondered at, seeing that whilst the position is in itself a not very agreeable one, the remuneration is so low as to tempt none but the most needy to accept it. The teachers must reside with the children in the house. Sometimes they have separate apartments for themselves; in other cases, they occupy the same dormitory as their pupils. In the Liskeard Union, I found the boys and their teacher all in one room. It was large, and contained many beds. Those of the boys stood side by side, in actual contact with each other. That of the teacher occupied a corner screened off from the rest of the room by a curtain. There was accommodation for forty-six boys, and there he was put to keep watch over them, and to see that they slept according to the laws of the workhouse. Such a situation can be pleasant neither for master nor pupils. Every one can enter into the feelings of the master. The pupils chiefly regard him in the light of their constant overseer by night and by day. To fill up the measure of their dislike to him, he is called upon to be the instrument of their bodily pain as well as the instructor of their minds; for when they transgress the ordinary rules, not of the schoolroom, but of the workhouse, on him generally devolves the task of administering the lash to them. Is it any wonder that few who are really efficient men can be found to occupy such a position? The guardians have frequently complained to me of the difficulty they experienced in supplying the place of a teacher when a vacancy occurs. The difficulty is easily accounted for. The great majority of the teachers only take the post as a prelude to something else. Their hearts are therefore seldom in their work, and their demeanour towards the children is often harsh, and almost invariably cold. I have found the poor creatures, when a kind word, accompanied by a kind look, was said to them, start and look up as if they doubted the evidence of their senses. From these schools they are turned adrift upon the world, with a slight smattering of the elements of education, but without the slightest moral preparation for the rough life that is before them. It is this, with the results which have followed, that has shaken the confidence of many good and thoughtful persons in these schools altogether. It is this also which partly induces the guardians in some of the unions to have the children sent to the national schools, instead of having them educated in the house. The necessity of overhauling the whole system of the union schools is now very generally canvassed in the country.

But in connection with this, as with other subjects, the truth, however startling or disagreeable, should be told. The farmers are now, in many instances, an impediment in the way of education. The church and upper classes are, more or less, favourable to it; but in the farmers, the employers of labour, is frequently found the great obstacle to its efficient promotion. I do not make this assertion hastily or without proof, for I find abundant evidence of it wherever I go.

To do justice to the farmers, a large proportion of them are insensible to the benefits of education. In many cases you cannot distinguish the children of the farmer, by their dress, demeanour, or intellec-

tual culture, from those of the labourer; and this, too, not only in the case of "smock farmers," as the lowest class of them are termed, but also in that of some tolerably well off in the world. There are others who give their own children the benefit of the best education that they can afford, but who would deny the same boon to the child of the labourer. It is but a few days since I met one of this class. He did not like the present order of things at all. There was too great a tendency in society now-a-days to heave up that which was below to the top. Labourers were anxious to become masters, and so on. To educate the labourer was only to enhance this evil. The child should succeed his father at his toil. His own son was then at the University, and was studying for the church.

Such are, in too many instances, the men who, by becoming guardians of unions, are entrusted with the education of the poor. Some of them speak out openly and express their disinclination to having them educated. They are obliged to comply with the letter of the law, but they care not for a master or mistress being qualified for the work of instruction. These are strong assertions, but they are borne out by facts, and every one acquainted with the views and conduct of the guardians of many of the purely rural unions—for it is of them only that I now speak—can attest their accuracy. The character of the teachers will generally bespeak that of the guardians. If they can distinguish between a good and a bad teacher, and do not remove a bad one—or if they cannot distinguish between them—they are not fit to be guardians. The cases are startlingly numerous in which they either cannot, or will not, make the distinction. I was informed by a gentleman, on whom every reliance can be placed, that when, some time ago, he entered the school-room of the St. Austel workhouse, he found the master setting a copy to a boy—"A blind man's wife need no painting." It was not even *needs*. In another school, the master, after showing me their copies, and making the boys read a little in my hearing, offered, as a test of their arithmetical proficiency, to "put them them through a sum in subtraction." In another case it was discovered that none of the children could write at all. An inquiry was instituted into this by the party whose duty it was to do so, and he discovered that the reason was that the schoolmistress herself could not write. He remonstrated with the guardians for having such a teacher, but they insisted upon it that she was good enough. Of what use was it to teach the children to write? It only made them bad servants, and they did not want them to write. The schoolmistress was afterwards removed by a higher power, but these same guardians re-elected her to her post. Whilst the party who moved in the matter had several letters from the guardians, insisting upon the sufficiency of her qualifications, he had also several letters from her to which was appended *her mark*. On another occasion, the same person, whilst examining a school, asked a girl what a quadruped was, the word occurring in her reading lesson. She could not answer. He then asked the schoolmistress if she did not teach them the meaning of such words. She replied that she did, and that

they all knew it, but that "they were so stupid." He then desired her to point out one who could tell him the meaning of the word. She went round the whole school, but not one was found who could do so. It then occurred to him to ask her if she knew it herself. She coloured, stammered, and at last admitted that she "did not exactly know." He then asked her if she knew what a biped was. That she certainly did not know; but, on being told that she herself was one, thought it was something awful, and afterwards complained to the guardians that her interrogator had called her names. I was informed of another case, in which a master was appointed who could neither read nor write. On being asked how he could undertake to teach, he said that he made the boys that could read teach those who could not, and that he listened to those who could read, and could easily tell when they went wrong. It would be unfair to infer that all the schools in question are thus miserably provided with teachers, but the system must be throughout a radically defective one, which can admit of such cases, even as exceptional.

The truth is, that there is much in our present system of education in the rural districts that is mere sham. We have a varied and tolerably extensive machinery apparently in efficient operation, but it is only when its working is closely inspected that it is found in too many cases to be anything but efficient. A great deal might be effected with the present educational apparatus, were it earnestly and honestly employed. But it is not so; and many a patriot and philanthropist is prevented from moving in the matter from a belief that the ground is now very generally occupied. It is, more or less occupied, but not cultivated. It is only here and there that you find efficient schools, particularly in connection with the National Society.

In the parochial union schools geography is now much more generally taught than formerly—the guardians having at length discovered the stimulus which a little knowledge of geography gives to emigration. At first they could discover no use whatever in maps. "Maps!" said they, when it was first proposed to introduce them; "you'll be bringing in the dancing-master next." In illustration of the value of geography as regards emigration, the following was related to me. A gentleman in want of a boy to accompany him to New Zealand, applied at a union school in which geography had not been taught. "Who'll go to New Zealand?" was asked of the whole school, but not one volunteered. The application was next made at a school where geography was taught. "Who'll go to New Zealand?" was again asked, and almost every boy in the school sprung forward, exclaiming, "I'll go—I'll go!" On examining them, it was found that many not only knew its position, and other circumstances connected with it, but could also state accurately the different routes by which it could be reached. No sooner was the anecdote known abroad than the guardians of the surrounding unions immediately ordered maps for their respective schools.

Notwithstanding all that has recently been done for the cause of education, the proportion of children growing up utterly uneducated is very great.

In almost every family such is the case with some. I make a practice of accosting almost every boy I meet, and inquiring into his education. I thus accosted one, some time ago, near Chewton Mendip, in Somerset, who was in his twelfth year, and had, according to his own account, been for some time at school, which, however, he had attended very irregularly. I asked him what he was learning, and he said it was a *b-abs* and the *i b-ibs*. I then asked him if he knew the Queen's name, to which he replied in the negative. I frequently ask this question of boys, and find that in fully half the cases in which I do so, of boys from ten to fourteen, they cannot tell the Queen's name, nor have they ever heard of her Majesty. I put some questions in geography to a boy, who told me he had been learning it for two years. "What is the shape of the earth?" I asked. "Round, like an orange," he answered. "What is a promontory?" I next inquired. "Master always skips about the promontories," he replied. "What is an island, then?" I demanded. "Master skips that, too, sir," said he. "Well, what is a river?" This he answered correctly; but on further questioning him in connection with the very elements of the study, the reply in three cases out of four was that his master "skipped" the subject. Nor was this the child of an agricultural labourer. He was the son of a tradesman, living in a Cornish town, and attending school regularly. Let it be borne in mind that not only are numbers of the rising generation growing up defectively educated, but that a larger proportion of them are doing so without any education at all. Even in Cornwall, where, comparatively speaking, so much is done for education by the different sects, this is the case to a very great extent. In treating of the Cornish mines, I have already had occasion to allude to the number of children engaged about them who could not read, and the still greater number who could not write. In a few years therefore, notwithstanding all the efforts which are being veritably or ostensibly made, a large proportion of those who are now children will be launched into manhood with all the stolidity and ignorance of their fathers.

Our social system is full of anomalies, but there is none greater, perhaps, than that presented by the parochial union school, such as it is. The child of the independent labourer is sent to toil at the age when he should be sent to school. It is only at irregular intervals that he enters a day-school, and it is not always that he can attend a Sunday-school. He never enters any school provided for him by law. But the child of the pauper finds a legal provision for the sustenance of his body and the culture of his mind. His day is not spent in toil, but is divided between his education and his amusements. When he leaves the school-room—which he attends, in summer for six, and in winter for five hours a day—it is to go to the playground, which he frequently finds provided for him with many of the appliances of childish sports. How different in their fates—the child of the independent man, and the child of the pauper! But where is the remedy for this anomaly? The evil is not that the pauper is too well off, but that the child of independence should not

be abreast, at least as regards his opportunities, with the offspring of poverty.

Having thus glanced generally at the educational system at work in the four counties in question, I now proceed to state the results of my observations as regards the morals of the labouring classes in all the counties which I have hitherto visited. In doing so, I regret to say, that the sketch which I am about to draw will be by no means of a favourable or encouraging description.

There are two things which strike every observer as exercising a most pernicious influence upon the habits and morals of the poor—the straitened character of their house accommodation, and the lowness of their wages. When I speak of low wages, I include casual work even at high wages—since, independently of the consideration that the average throughout the year may be low, those receiving them are frequently exposed to greater privations than are those steadily employed at low wages. But it does not follow that the ordinary day labourer in the fields is highly paid when only casually employed. If the rate of wages is but 7s. a-week, and he is employed but for one day in the week, he gets but his fourteen pence a-day, like the man steadily employed. To low wages, therefore, a great proportion of the agricultural labourers have to add the terrible disadvantage of unsteady employment at the lowest rates. Taking the rate in Dorset as 8s. throughout the year, including the higher rates of harvest, there are many who will not average 5s. a-week, taking the whole year round. In considering, therefore, the effect of low wages upon the condition and conduct of the poor, it is not enough that we take into account the nominal rate per week throughout a district, as there may be hundreds in it who are not realizing that rate for two consecutive weeks at a time.

The facts which I have from time to time stated, as illustrating the overcrowded condition of a very large proportion of the cottages, are so eloquent of themselves, that it is scarcely necessary for me to add anything as to the pernicious influence which such a state of things must have upon the morals of the poor. When families of from six to twelve individuals, of both sexes and of all ages, are huddled together night after night in two, three, or four beds, all in one room, what are we to expect as the result but a very general and a fearfully precocious immorality? I have met now and then with families crowded in their straitened dwellings, who were, nevertheless, pious, lovers of truth, honest in their dealings, and exemplary in their conduct. But such green spots are rarely met with in the wide moral waste; and one marvels at their appearance at all. With the great bulk of the peasantry there is a laxity of morals, which is as easily accounted for as it is painful to contemplate. The moral sense of many of them revolts at the circumstances in which they are placed; but the most startling feature connected with the whole matter is, the utter indifference which multitudes, who complain loudly enough of their physical privations, evince as regards the immoralities to which their condition gives rise. In thousands of breasts the distinction between right

and wrong is but faintly traced, if it is not altogether obliterated. Perhaps in all this they are more to be pitied than blamed, for the mode of life to which they are condemned would sap the morality of any class of people.

There are two classes amongst them who suffer from the manner in which the peasantry are herded together in their miserable dwellings. There are, in the first place, those who, from peculiar circumstances, may have reached maturity with some delicacy of feeling and purity of mind preserved to them, of which they are gradually robbed through the pernicious influences to which they are exposed. It is possible that some of these may successfully stem the torrent of immorality which would bear them down, and come pure and undefiled out of its filthy waters at last. But these are few indeed. It is possible, too, that some of them, having fallen away, may yet reclaim themselves, the virtues of early life triumphing at last over engrafted vice. But such instances are also of rare occurrence. There is, in the next place, that other class, and by far the more numerous one, the members of which advance from infancy to puberty, aliens to shame and strangers to the common decencies of life. Of these, what can reasonably be expected, but that the vices which are sown broadcast in them during their youth will grow with their growth and strengthen with their strength?

Let us consider, for a moment, the progress of a family amongst them. A man and woman intermarry, and take a cottage. In eight cases out of ten it is a cottage with but two rooms. For a time, so far as room at least is concerned, this answers their purpose; but they take it, not because it is at the time sufficiently spacious for them, but because they could not procure a more roomy dwelling, even did they desire it. In this they pass with tolerable comfort, considering their notions of what comfort is, the first period of married life. But, by-and-by they have children, and the family increases until, in the course of a few years, they number perhaps from eight to ten individuals. But all this time there has been no increase to their household accommodation. As at first, so to the very last, there is but the one sleeping-room. As the family increases additional beds are crammed into this apartment, until at last it is so filled with them that there is scarcely room left to move between them. As already mentioned, I have known instances in which they had to crawl over each other, to get to their beds. So long as the children are very young, the only evil connected with this is the physical one arising from crowding so many people together into what is generally a dingy, frequently a damp, and invariably an ill-ventilated apartment. But years steal on, and the family continue thus bedded together. Some of its members may yet be in their infancy, but others of both sexes have crossed the line of puberty. But there they are, still together in the same room—the father and mother, the sons and the daughters— young men, young women, and children. Cousins, too, of both sexes are often thrown together into the same room, and not unfrequently into the same bed. I have also known of cases in which uncles slept in the same room with their

grown-up nieces, and newly-married couples occupied the same chamber with those long married, and with others marriageable but unmarried. A case also came to my notice, already alluded to in connection with another branch of the subject, in which two sisters, who were married on the same day, occupied adjoining rooms in the same hut, with nothing but a thin board partition, which did not reach the ceiling between the two rooms, and a door in the partition which only partly filled up the door-way. For years back, in these same two rooms, have slept twelve people, of both sexes and all ages. Sometimes, when there is but one room, a praiseworthy effort is made for the conservation of decency. But the hanging up of a piece of tattered cloth between the beds, which is generally all that is done in this respect, and even that but seldom, is but a poor set off to the fact that a family which, in common decency, should, as regards sleeping accommodations, be separated at least into three divisions, occupy, night after night, but one and the same chamber. This is a frightful position for them to be in when an infectious or epidemic disease enters their abode. But this, important though it be, is the least important consideration connected with their circumstances. That which is most so, is the effect produced by them upon their habits and morals. In the illicit intercourse to which such a position frequently gives rise, it is not always that the tie of blood is respected. Certain it is that when the relationship is even but one degree removed from that of brother and sister, that tie is frequently overlooked. And when the circumstances do not lead to such horrible consequences, the mind, particularly of the female, is wholly divested of that sense of delicacy and shame which, so long as they are preserved, are the chief safeguards of her chastity. She therefore falls an early and an easy prey to the temptations which beset her beyond the immediate circle of her family. People in the other spheres of life are but little aware of the extent to which this precocious demoralization of the female amongst the lower orders in the country has proceeded. But how could it be otherwise? The philanthropist may exert himself in their behalf, the moralist may inculcate even the worldly advantages of a better course of life, and the minister of religion may warn them of the eternal penalties which they are incurring; but there is an instructor constantly at work more potent than them all, an instructor in mischief, of which they must get rid ere they make any real progress in their laudable efforts—and that is, *the single bed-chamber in the two-roomed cottage.*

So well aware are parties resident in the country of all this, that in many families you will now see none but town-bred servants. True, this may partly be accounted for by the utter ignorance in which young women in the country are generally brought up of every thing connected with the economy of a household. But this is not the only reason that is given you when you inquire into the cause of it. With many their prevalent demoralization weighs far more than the other consideration with those who reject the proffered services of the rustics. Yet how many in our towns, acting

upon a contrary belief, look to the country as the only quarter where they can obtain honest and virtuous menials. This, I was told, had been done to a great extent in Bath, and I shall never forget the description given to me of the results by one of the resident clergymen of the city.

Perhaps the most striking instance of the demoralization of a whole community, from overcrowding and other unpropitious circumstances, is that furnished by Sutton Courtney, in Berkshire, formerly alluded to in connection with the subject of education in that county. I was not then aware of the notoriety which this village had already attained. When England was first divided into unions, that of Abingdon was about the first to be marked off. The people of Abingdon were willing that the commissioners should draw any line they pleased, provided they only excluded Sutton Courtney from the union. Its character was then so bad that the people of the neighbouring parishes recoiled from the idea of being comprehended within the same division with it. The commissioners having acquainted themselves with the grounds on which this request was made, complied with it, and Sutton Courtney was erected into a union of itself, on the understanding, however, that whenever it amended its character it should merge into the Abingdon union. It is now part and parcel of that union, from which it is to be inferred that its character has somewhat improved. It was therefore in its amended state that I found it. Judging from its present condition, it must formerly have been inconceivably bad, or the people of Abingdon have been satisfied with very slight tokens of amendment. Despite the exertions of the zealous and independent vicar, the Rev. Mr. Gregson, whose efforts have not been without some success, the place is to this day a focus of intemperance and debauchery of every kind. Chastity is a thing little known in the village, and not at all respected. The want of it is regarded as no stain on a woman's character, nor does it mar her prospects in the slightest degree. Herself a prostitute, and the companion of thieves and prostitutes, she is just as likely to marry and get settled—as people in her class of life are generally settled—as is the honest and virtuous woman in localities possessing a higher standard of morality. I found more than one family of children going by different names. The mother was unmarried, and the different names indicated the paternity of the different children. Again, a whole family has been known to go by different names at different times. Thus, if the mother were living with a man of the name of Smith, the children took his name, but if she changed her paramour, and lived with one named Tomkins, the family would go by the new name. Children have thus been known to give to parties inquiring one name to-day and a different one to-morrow. It is distressing to witness the early age at which they commence a life of active immorality. Young girls may be seen at the public-houses sodden with gin or drunk with beer. There is, of course, no line drawn by them for the regulation of their conduct after this. Indeed, they are proficient in licentiousness ere they reach this point. The violence of their temper, too, leads them into

perpetual brawls and fights. I was told by one woman that when she had occasion to send any of them into the fields, she always sent a boy and a girl, because they would not quarrel; whereas if she sent two boys or two girls, they were sure to disagree and fight. The vicar has at length induced some of them to attend church; but when he first took possession of his charge, he used to find the men, surrounded by nearly all the women and children of the village playing quoits before the church door on Sunday morning.

Perhaps the worst feature connected with the immorality prevailing amongst these classes is the apparent absence of all shame on the part of those guilty or that of their friends. It really seems in many places to be taken as a matter of course that a young woman will be found with child before she is married. Many are married as soon as they become pregnant. When marriage does not take place the child is generally consigned to the care of the mother of the girl, whilst she herself, when she can, goes out in the capacity of wet-nurse. The grandmother will speak as coolly of the whole affair as did both mother and daughter in the case alluded to in a former letter from Cornwall, terming it a "misfortune," but the misfortune being more the necessity of maintaining the child, than the stain on the woman's reputation. Indeed, I have reason to believe that in an immense number of cases young people come to a distinct understanding with each other to cohabit illicitly, until the woman becomes pregnant, the man promising to "make an honest woman of her" as soon as that takes place. This they find more convenient than marrying at once, inasmuch as the girl may be at service for herself, and the man elsewhere employed all the time. They meet occasionally, and are thus relieved at least of the responsibilities and the duties of housekeeping, living better on their separate earnings than they could do in a house of their own.

This practice of cohabitation before marriage is almost universal. It is not only a characteristic of low rural life, it is also so with the miners and the fishermen. Even in the fishing village of Mousehole, the people of which are in general so orderly, it is the case. And this, too, notwithstanding the extent to which temperance has prevailed among them. Total abstinence has not effected much in this respect for society. The miners and pitmen, too, are much more under the influence of constant religious teachings than is the rural labourer. And yet they are no better than he is, so far as the practice alluded to is concerned. When a young fisherman passes eighteen he generally gets a man's wages. Immediately thereupon he gets a new suit of clothes and a watch, after which he fancies himself sufficiently set up in the world to commence a courtship, which generally leads to an early marriage by the course mentioned. In some parts of Cornwall the immorality of the females at work about the mines is notorious and proverbial.

It is on the Sunday evening that most mischief is done in this respect. No one can enter or leave a rural town at that time without being convinced of this. It is the time when servants, both male and female, are most generally permitted to go out,

and it is therefore that for which they arrange most of their assignations. They have a slang of their own, in which their arrangements are pretty unreservedly made in the presence of those who, they think, have not the key to it. This, after some time, I became acquainted with, and I have frequently overheard them planning their assignations, which, in nine cases out of ten, were arranged for the first Sunday evening. The extent to which very young persons of both sexes participate in these arrangements is really shocking.

Nothing can be more fatal to the young girl, after the training which she has received at home, than the work to which she is so early consigned in the fields. She there often meets with associates, even of her own sex, who speedily qualify her for any criminalities in which she may be afterwards tempted to participate.

To every one all this must appear very horrible, whilst to some its relation will seem indelicate. But the only question worth considering is, whether or not it be true. If true, is it not better that it should be openly exposed, than that, existing, it should be suppressed, for fear of offending the questionably delicate? It is unfortunately but too true; and being so, it is high time that the attention of society should be earnestly directed to the essentially demoralized state of the substratum at its base.

I was anxious to ascertain the effect, if any, produced by the late bastardy law in the different localities which I visited. But on this subject I found it extremely difficult to obtain any information of an authentic character. So far as the workhouses were concerned, the registers of births within them sufficed to apprise me of the true state of things. But on the subject generally, as affecting the parishes constituting the unions, I could only procure expressions of opinion, and these were sometimes singularly contradictory. The general impression, however, seemed to be that the law had had but little effect one way or the other. But to show how difficult it is to get correct information on this subject, I was told by some of the guardians in the workhouse at Wareham that they were inclined to believe that bastardy had decreased, not only out of doors, but even in the house; whereas, on inspecting the books, I found that quite the contrary was the case as regards the workhouse. I found that the number of illegitimate births which had taken place in the workhouse, since 1838 inclusive, was 53, giving an average of about $4\frac{1}{2}$ per year. But for each of the last two years the number has been 7, or about 60 per cent. above the average of the last eleven years. This, however, is not to be taken as an indication of a similar increase outside, inasmuch as the greater difficulties than formerly which are now in the way of affiliation drive women into the house who would not otherwise, perhaps, have entered it.

In small parishes, where the clergyman is frequently brought into personal contact with the labourers, and where, from other causes, he exercises a direct influence over them, they may be found pretty regular in their attendance at church; but, generally speaking, their attendance is neither large nor constant, most of them moping about on the

Sunday smoking and drinking, and some of them spending nearly the whole day in bed.

Another circumstance which powerfully affects the morals of the poor, is the lowness of their wages, and the physical privations to which they are thereby subjected. If a labourer has abundance of room for his family in his cottage, he will crowd them all into a single chamber, and let the other rooms if he can. The evils incident to his position are thus of a complicated character. In the great majority of cases he has not sufficient house accommodation, whilst in those in which he has, the lowness and uncertainty of his wages, and his consequent scanty command of the necessities of life, induce him, when he can, to throw away the advantages of it. Thoroughly to elevate him, the work of improvement must be simultaneously pursued from different points.

A large proprietor being asked, when the conversation had turned upon the state of wages, how the poor could live upon the pittance per week which they earned so precariously, turned round, and said somewhat sternly, "they steal." This is true to a frightful extent throughout the counties in question. Petty theft, on his own and his family's part, may be regarded as part and parcel of a labourer's means. This is truly an alarming position in which to find so large a class of the community; but it is, nevertheless, their veritable position; and that it is generally known to be such throughout the country districts, is evident from the universal testimony to the fact borne by those who care for conversing upon the subject. Ask any one how families can live on 7s., 8s., or 9s. a-week, and the answer almost invariably is, "They can't do so *honestly*." The inference is irresistible that they live dishonestly; and so the great bulk of them do. This is more particularly the case as regards the article of fuel. In general I find them open, unreserved, and communicative on almost all other subjects; but the moment I touch upon the subject of fuel, their whole demeanour, in most cases, undergoes a change, and their awkward and incoherent statements are often in perfect contrast with their former readiness and consistency in reply. You can see at once that, whilst they tell you something, there is much that they are keeping back. In some places, furze is raised for fuel, and they are not so ill off in this respect; in others they burn turf, which they sometimes get for the cutting, although at others they have to buy it. When they have to buy their turf, or when there is neither furze nor turf, and they must look for their fuel to coal or wood, the greatest privations are suffered as the consequence of their very scanty supply. When they buy their wood, they buy it in faggots, a faggot being frequently little better than a bundle of green twigs. Even this they are not always able to purchase; when, unless they are permitted to take wood, which is very rarely indeed the case, they have to look to theft alone for their supply of fuel. In many parts of Cornwall, Devon, and Dorset, and in some parts of Wilts, they are comparatively well supplied by the furze and turf, but in the other portions of these counties—throughout the greater part of Somerset, and I may say, the whole of Bucks, Berks, and Oxford—where they have

nothing but wood or coals to burn, one universal system of pilfering prevails in respect to fuel. Both as regards themselves and others, this is a perilous alternative to which the poor are driven by the sad necessities of their position. Without expending any of their means in the purchase of fuel, they manage, in most cases, but to eke out a mere existence, generally on an almost exclusively vegetable diet. To buy so much coal, wood, or turf, as would serve them, not only for culinary purposes, but also to warm, during the cheerless months of winter, their damp, cold, and desolate homes, would, in very many instances, make greater inroads than they could bear into their means of procuring mere edibles. The consequence is, that such fuel as they cannot buy or get in charity they are driven to steal. The evil of this is manifest, for it is generally through the instrumentality of the children that the wants of the household are thus supplied. Petty theft is thus the first positive vice with which they are brought in contact, and in the practice of which they are almost daily instructed. What is the consequence? The child who becomes an adept in stealing wood is soon qualified for robbing a hen-roost. From that again to stealing a sheep there is but another step; and, in the words of a clergyman with whom I was conversing on this subject, "when a man goes out to steal a sheep he is ready for anything." Is it any wonder, seeing how many children are thus perniciously instructed, that so large a proportion of those who figure in the statistics of crime are juvenile delinquents? The course which this mischievous education takes with the child was well illustrated by an incident which happened as I was walking over his glebe in company with the vicar of Southleigh. On turning a sharp corner we met a boy on the road dragging home a piece of timber. On seeing us he immediately dropped it, assuming, at the same time, that half-frightened, half-ashamed look, which those who are not thoroughly callous assume on being detected in the very act of committing an offence. "Where did you get that piece of timber?" asked the vicar. "I found it on the road," said the boy, who was but eight years old. This was a falsehood, for he had taken it out of the neighbouring copse. The vicar sent for the mother of the child. Her plea was that she sent him for wood, but did not enjoin him to steal it. She well knew, however, that he could not get it without stealing it, and he well knew that he was not expected to come home empty-handed. What an education is this for a child! It may be said that it is but a trivial offence to take a piece of wood. But the evil is, teaching the child deliberately to do that which he knows and feels to be wrong. He does it *animo furandi*, and thus it is that the line between right and wrong is so early erased from his mind.

One of the objects of the coal clubs, established in some places, is to check this monstrous evil.

Let me say, in summing up the whole, that a pervading moral apathy is the general characteristic of the peasantry, when positive crime is absent—an apathy which leads, in too many cases, to an utter indifference to the distinction between right and wrong.

In connection with this subject, it is extremely discouraging to find how little good is effected by the education received in the workhouse. It is painful to find how few of the children who are turned out from some of the workhouses come to any good. This shows two things: first, how difficult it is to eradicate the pernicious influences of an essentially vicious domestic education; and, secondly, how little proper training accompanies the mere acts of teaching in the workhouse. In many instances have cases been pointed out to me of boys entering the gaol soon after leaving the

house, and of girls returning pregnant to it a year or two after they had left it.

To many who have not been prepared for such revelations the foregoing may appear to be one sweeping calumny against the agricultural labourer. But it is not hastily that I have prepared this indictment, and to prove it I can call confidently into court the landed proprietor, the farmer, the guardian of the poor, the governor of the workhouse, the minister of the parish, and the magistrate of the county.

(To be continued.)

ON DRY WARPING AT HATFIELD CHASE.

BY WILLIAM EDWARDS.

The interest which attaches to the improvements of peat moors, and the peculiar importance of the process I am about to describe, induces me to lay before the society a more full description of it than the incidental mention made of it by Mr. Pusey, in his paper on Lincolnshire Farming—I allude to the improvements of Hatfield Chase, in Yorkshire, by what may, not inaptly, be called “dry warping.”

The ordinary process of “warping,” as practised on the banks of our tidal rivers, is well known. It is only applicable to situations where the muddy water can be turned on the land, and readily drained off after it has deposited its alluvial matter.

“Dry-warping” is the spreading over land that deposit or other soil, to a depth of six, eight, or nine inches, and thus converting barren or inferior into fertile land, ready for immediate cropping.

It is obvious that, to do this economically, a considerable supply of the intended covering must be at hand; and though, perhaps, few estates in England may possess the peculiar advantages in this respect of Hatfield Chase, there are very numerous situations where the process may be advantageously adopted; and in Ireland it may be applied on a great scale, under conditions in every respect as good as at Hatfield. Hence the importance of drawing the attention of agriculturists in this country, and of the landowners of Ireland, to a system which Mr. Pusey very truly describes as converting “the bog of Allan into the vale of Aylesbury or of White Horse.”

Hatfield Chase is a peat moor of about 4000 acres, lying above the level of the neighbouring cornlands. An Act for inclosing the moor was obtained about forty years ago, though for what object at the time, it is not easy to see, as no one could have then anticipated the possibility of making the hitherto impassable morass of any value. By the

public and private enclosure drains it became, however, gradually firm land, and the existence of the tidal river Thorne, or Idle, whose waters nearly 200 years ago had taken a new channel—was remembered, and Mr. Hatfield Gossip, of Hatfield Hall, who owned a considerable part of the moor, conjectured that this old course would contain an immense mine of the mellowed and rich alluvium, deposited by the tides from the Trent and Humber. He conceived the idea of covering the whole moor with this alluvium; and to this idea, and to his determined perseverance and skill in carrying it out, we are indebted for the practical exposition of the advantages of *dry-warping*.

The process pursued by him is as follows:—A railroad is carried from the pit (or excavation into the alluvial deposit) over the moor to the part to be improved. Here branch railroads, formed in the separate pieces of framework, are laid down right and left from the main line. A stationary engine draws up the loaded waggons, which are then taken by a locomotive engine along the main line, and passed by the branches to the spot; here the waggons are tilted over, and the soil spread to a depth of six or eight inches. When the moor, for seven to ten yards on each side of the branch, is covered, the rail is removed by a machine traversing the rails, and which takes up the separate pieces, and deposits them in a fresh line with the greatest expedition and facility; and thus, as Mr. Pusey remarks, “you see a sheet of firm and fruitful soil steadily spreading over the hopeless quagmire:” but the latter expression is hardly applicable, for no *quagmire* would admit of the passage over it of heavy locomotives, and the long and complete drainage of the moor has solidified the whole sufficiently to bear any load. Were it otherwise, a system of light waggons and rails and Welsh ponies

may be brought into operation ; and indeed in most cases this will be more economical and under greater control. The moor is thus covered at the rate of eight or ten acres a day with a clean and friable soil, absolutely ready for seed day by day, as fast as it is levelled ; for the fine alluvium does not require any previous exposure to the atmosphere. The rapidity with which the barren waste is converted into rich land, actually cropped, is a remarkable and most interesting feature in the operation.

The advantages of a well-drained substratum of peat have been long appreciated for grass-crops. Here the fresh coating of rich soil produces a slow decomposition of the old vegetable covering of the peat, as well, perhaps, as of the peat itself ; and the roots of the grass or other crop, striking deep into these, always find moisture and nutriment. The effect is, that most astonishing crops of clover, turnips, and particularly beans, have been grown on the newly warped land ; and it has been found that the grass is green in the driest seasons, and possesses peculiar milking and feeding qualities. Thus it is attested that 100 acres of it fattened, between Blythe fair (16th of May) and the 25th of August, 95 beasts on an average, 600 sheep, and 250 lambs ; after that, to the 5th of September, 400 old sheep ; and the pasture was left very good.

It is not necessary to give more in detail the process for conveying the soil or warp from the pit to the moor. The operation is in itself of the simplest description. The scale on which it is to be carried out alone will render some skill and engineering knowledge necessary, to be varied in every locality ; and unless where a locomotive is thought desirable, it is essentially a "farmer's job." Neither must we consider it as necessarily to be confined to the peat moor, or to a tidal deposit. Wherever any substitute for this latter can be found in quantity, and in the vicinity of barren or valueless land, the system may be pursued to national and individual benefit. In the neighbourhood of the Trent and Humber there are thousands of acres now of little account ; and not far off, beds of tidal alluvium, as little considered by, or perhaps known to, the farmers about, as that at Hatfield before Mr. Gossip developed it. A tract of about 4000 acres, called Thorne Waste, a few miles off, is about to be "dry warped" upon Mr. Gossip's plans, but the warp is not on the spot, and will be brought by the Axholme Railway a considerable distance. Still it has been considered by the farmers there sufficiently desirable to justify an act of parliament (11 & 12 Vic. c. 150) for empowering them to enclose, drain, and warp it, even at an expense of £35 per acre.

There is little question that, as the system becomes extended and developed, the cost of dry

warping will be reduced. Mr. Gossip's costs £15 per acre near the pit ; but the average of the moor will be £18, including plant, on account of the extended carriage, &c. Tenants have been always readily found to pay £2 per acre for the newly warped land, and an offer, with security, is now under consideration for £2 per acre for the whole moor, on a ten years' lease.

The peat retains its moisture in dry seasons, even when deeply drained ; but it is expected that great advantages will be derived from subirrigation. The warp pit, which will extend over nearly 50 acres, forms a reservoir from which the deep and divisional drains may be filled at pleasure. The subject of subirrigation is of an importance great in itself, and increasing with the increase of deep draining, but it is only incidental to the object of this communication.

Mr. Gossip proposes to lay the whole moor down in grass, and divide it by quick-fences into 100-acre fields. It is found that quickset thrives most luxuriantly on the warped land, and thus a sufficient protection will be rapidly obtained for the Cheviots and hardy Scotch stock ; and that gentleman may, with reason, pride himself as the instrument for converting 4000 acres of barren peat into one of the finest grazing-farms in England, and as the practical introducer of a system already applied to another similar-sized tract, and applicable more generally than at present thought of, to the material increase of the agricultural resources of our country. As to Hatfield Chase, it is doubtful whether any equal extent can be found in the celebrated vales mentioned by Mr. Pusey, to compete in produce and actual fertility with this once "hopeless quagmire." —Journal R.A.S.

NEWTON AGRICULTURAL SOCIETY.—On Thursday, the annual exhibition of stock, implements, seeds, and poultry, took place in the large timber-yard of Thomas Leigh, Esq., the president. The day being fine, a vast concourse of people assembled to witness the show. The horses, bulls, pigs, &c., were of a first-rate description, but the cattle were only of a middling quality. In the yard we observed, in addition to the local gentry, several hundreds of respectable farmers. The judges awarded the premiums in a manner which gave general satisfaction. Mr. Wright, of Newhey, Newton, was awarded five guineas and a silver cup for the best cultivated farm, Mr. Jones, of Newton, carrying off the five-guinea prize for draining. Mr. Clayton, Mr. Owen, Mr. Clarke, and Mr. Nethold, were all distinguished for various agricultural improvements. Miss Hamer produced the best white seed wheat ; and Thomas Waleworth, of Haydock, carried off the prize for the neatest and best-cultivated cottager's garden. The most successful competitors in the live stock were Messrs. Livesley, Muspratt, Cartwright, Lawton, Ball, Mercer, Jones, &c. Mr. Ashton and Mr. Gaskell were first in vegetables ; Mr. Whillon, Mr. Pemberton, and Mr. Clayton, in poultry. There were a variety of small sweepstakes, which caused not the least exciting part of the exhibition. A splendid dinner was afterwards laid for upwards of 250 persons, at the Horse and Jockey Inn, in Newton. W. Mercer, Esq., occupied the chair ; with J. Wilson, Esq., as vice chairman. —*Liverpool Courier*.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

READING, March.

On the border of North Hampshire lies the estate of Strathfieldsaye, the gift of a grateful country to the Duke of Wellington. We passed through it on our way into Berkshire, and, having made its condition and natural resources the subject of some inquiry, venture to include in this communication a brief outline of what we saw and heard there. We are the more encouraged to do so because we have learnt nothing which does not redound to the honour of his Grace as a landlord, and because, in satisfying the public curiosity on a subject to which a peculiar interest attaches, we feel that we are only about to strengthen those sentiments of pride and veneration with which "The Duke" has so long been regarded. We have also been actuated by the desire to place his Grace's character in a new view before his countrymen—a view in which the example he has set will be most useful, as tending to teach the landed interest that he who holds the soil as his property must execute those permanent improvements upon it, without which it cannot be made to yield its full increase, and be a source of profit to all concerned in its cultivation. The general quality of the land on the Strathfieldsaye estate is a strong retentive clay, much in need of drainage, and requiring very careful and delicate management to render it productive. We found the farmers fully alive to the absolute necessity of tile drainage, and it is carried on very extensively at the Duke's expense. The operation considered next in importance for the improvement of the land is chalking, the advantage of which on soils like those of the Strathfieldsaye estate the farmers think cannot be overrated, though the great expense of carting several miles 20 tons, the quantity used for an acre, has hitherto limited its full application. By the opening of the railway from Reading to Basingstoke this difficulty has been greatly lessened, chalk being carried along the line, and delivered at convenient points, for half the former cost. In this improvement also, as in that of drainage, his Grace takes the principal share, chalking the land of many of his tenants at his own cost. The nature of the soil renders it, under its present management, unsuitable for the feeding of stock. It is strictly corn land, wheat and beans being the staple produce. The system of cultivation pursued is to plough up the clover lea after the second crop is consumed in autumn; thus exposing the furrow to the pulverizing effects of the frosts and thaws in winter; after which it receives a clean summer fallow, being repeatedly ploughed and harrowed till it is brought into fine condition, when it is sown with wheat in October. After the wheat is reaped, the land lies untouched during the winter, and as soon as it is dry enough in spring a heavy complement

of dung is spread upon it, which is immediately ploughed in, and the ground planted with beans; the beans are dibbled in by women, who are employed by task-work, and who set the seed in rows, marked by a garden line. During the summer, the land is carefully hoed between the rows, and after the bean crop has been removed it is ploughed and sown with wheat. After wheat follows barley, a portion of which is laid down with clover, the rest being reserved to be sown in the following spring with peas, of which an excellent variety called the "Victoria marrowfat" is in great favour, selling at 40s. a quarter. The average produce of wheat is from 26 to 30 bushels per acre. From the nature of the land it is found very injurious to work it when wet, and a great strength of horses is therefore kept to push forward the work in favourable weather, a farm of 300 acres having as many as 16 work horses upon it. The only other stock consists of a few milk cows, some colts, and a number of pigs, which are let loose in the yards. Stall feeding is scarcely practised, and when tried is found very unprofitable; but this is not surprising, as fattening oxen are, in one instance at least that we heard of, fed on cake and other substances, valued at 10s. 6d. a week for each animal. It is not to be expected that such management can leave a profit. The rent of land on the Strathfieldsaye estate is about 20s. an acre, the tithes being about 7s., and the poor rates from 2s. 6d. to 3s. 6d. The farm buildings present, for the most part, a great contrast to what we saw in every other part of the county. His Grace, in this respect, has effected great improvements and been at an immense outlay. He has, whenever an opportunity arose, substituted for the crazy old structures, half wood and half thatch, which formerly yielded an imperfect and dangerous shelter to the farmer's produce and live stock, substantial edifices of brick and slate. He has not only given new farm buildings, but he has thoroughly renovated, or, more properly speaking, rebuilt the greater number of the farm houses. The cottages on the estate also have engaged his Grace's attention, and shared in the distribution of his capital. Having had them fitted up so as to afford decent and comfortable homes for the labouring population, he has taken them all into his own hands, and thus secured the humbler classes on his estate from any exacting or unfair treatment in the important matter of rent. Each cottage has about a quarter of an acre of garden-ground attached to it, and is let for 1s. a week. For many years the Duke has, as we were informed, expended on the Strathfieldsaye estate nearly the whole amount of its rental. Had the same liberal expenditure been made on a different soil and under more favourable circumstances in other respects, the results would

have been still more visible than they now are to the eye of a stranger passing through the country; but, even as matters stand, enough is observable to place his Grace in an honourable position among the list of improving and enlightened landlords. His Grace has, however, no great reason to think highly of the agricultural skill which the nation displayed in purchasing for him such an estate as Strathfieldsaye, an estate possessed of little natural beauty to recommend it, and with a soil so stubborn and unprofitable to cultivate, that it would break the heart of almost any proprietor but "the Iron Duke" himself to carry out upon it extensive permanent improvements.

Berkshire, like several other counties visited by us, possesses great varieties of soil, which modify its agricultural character; making dairy farming predominate along the Isis, in the Whitehorse Vale, and along the banks of the Kennet. The land sloping to the Thames on the eastern boundary of the county is also largely under grass; but the pasturage is so rich as to be applied to the feeding of stock as well as to dairy purposes. Over the large central space through which the chalk formation extends, sheep farming is combined with tillage, and the operations of husbandry are carried on upon a scale of considerable magnitude. The mixed soils of clay, gravel, and sand, which occupy the district south of Reading, are principally under tillage, with a stock consisting chiefly of sheep and pigs, but sometimes having a few dairy cows and some feeding cattle. The stiff clay on nearly all the farms in this part, and the impossibility of folding on it in wet weather, render sheep a less suitable stock than in other parts of the county. Pigs, therefore, are fed off in great numbers for the market; and, besides the value of their manure, are held in great estimation from the excellence of the breed. The feeding of cattle forms so inconsiderable a portion of the system of farming in the district south of Reading as not to require any notice. It is singular, however, and shows the backward state of agriculture here, that this branch of his occupation should have hitherto been so neglected by the farmer. The size of farms varies from 150 to 200, and sometimes 300 acres, and they are usually held from year to year. Tenants are said to be possessed of very inadequate capital for the successful prosecution of their business, and as a proof of this it was mentioned to us on good authority, that it has lately been not at all unusual for a farmer to have his turnip crops fed off by sheep belonging to some neighbour without any remuneration, he himself being unable to purchase the stock requisite to consume them. The farm buildings in this part of Berkshire do not differ in their general character from those in the other agricultural districts through which we have passed, being totally inadequate for the purposes which they were intended to serve. In the primary matter of drainage, also, nearly everything remains to be done, and, with so much work in these two important departments of permanent improvement before them, the owners and occupiers of the soil need hardly have their attention drawn to minor points, such as the clearing away of hedgerows and the formation of good farm roads, with regard to

which a great change must be effected before the productive qualities of the soil can have fair play and be fully developed. We have sketched thus rapidly and imperfectly the general outline of the state of agriculture in the south-eastern portion of Berkshire, in order that we may be able to give the details of a case which appears to us to contain the germ and promise of a better and more prosperous era in the farming of this district.

The farm of Sir John Conroy, about four miles to the south-east of Reading, is managed in such an admirable manner that we shall devote a brief space to its description. It consists of various soils, but principally fair stock land, not very deep in staple, some of which lies on a retentive substratum of clay, and some on an open gravel. Four years ago (for Sir John is a farmer of only four years' standing) the whole of the arable farm, comprising about 320 acres, exclusive of the park surrounding the mansion, was divided into numerous small fields by high wooded banks, every one of which has been removed, the soil in them being scattered over the adjoining land, while a sufficient number of the best trees were left to give variety and charm to the landscape. Every acre of the land was then drained with inch pipes, laid four feet deep, the drains being 15 feet apart in the stiffer lands, and 30 feet apart in those which were of a drier character. Further experience leads Sir John to think that a greater distance would have sufficed on the latter, much of which is of that nature which most farmers would consider a waste of money to drain at all, and probably nothing could better convince them of the incorrectness of such an opinion than a peep into what Sir John calls "the bigot's hole," a square box, in which at a depth of between four and five feet two main pipes are to be seen constantly pouring the drainage of 40 acres of this description of soil. Immediately following the drainers the whole farm was trenched by forks to a depth of 22 inches, the surface being carefully retained uppermost by being thrown forward to cover the previously trenched portion of subsoil. The cost of both operations, drainage and trenching, was nearly £12 an acre, so that if a great improvement has been effected it must not be overlooked that it has been done by a large outlay of capital. Farm roads were at the same time made, which serve the double purpose of accommodating the different fields, and of separating the one from the other. Commodious farm buildings were also erected. The land is managed strictly on the four course system, every modern improvement which is applicable to this system, and has been previously proved to be profitable, being adopted. The Swedes, of which we saw an excellent crop, are manured with yard dung of the richest kind, and 4 cwt. of superphosphate to the acre. A portion is drawn for consumption in the stalls, and the rest are eaten on the ground by sheep, that part which is still to be eaten having been laid in heaps and covered with a little earth to shield them from the changes of weather, and to prevent them exhausting themselves and injuring the ground by running to seed. The sheep are a South-down ewe stock crossed with a short-woolled Leicester, the produce being a half-bred lamb which

grows and fattens very rapidly. At the end of the fold, next the untouched turnips, spaces are left through which the lambs only can pass out and in, and here boxes are placed containing an unlimited supply of bruised beans, peas, and oilcake, of which they partake liberally, besides nibbling at the green turnip-tops, and at the turnips themselves as their mouths get strong. They are ready for the London market by Good Friday, and as soon after that as possible; the ewes being immediately afterwards put on the best feeding to hurry them on for the market with the utmost despatch, the great object being to turn the capital over in the shortest possible time in which a profit can be secured. A new stock is again purchased at the first favourable opportunity after the old has been disposed of. As the turnips are consumed the land is ploughed and sown with barley, drilled in rows six inches apart, by Garrett's drill, two bushels of seed having been last year used to the acre, though, considering the high condition of the land, and its perfect drainage, that quantity is thought too much, and one bushel and a half is to be tried this season. The produce last year was seven quarters an acre. The barley is followed by clover and seeds, part of which is fed and part mown. After the second crop is fed or mown the ground is ploughed (Howard's Bedford two-horse plough being in all cases used and much approved), and then rolled by Crosskill's clodcrusher. The ground is then harrowed, and one bushel of wheat per acre drilled in in rows 22½ inches apart, and nothing can exceed the regularity and beauty of the plant at this moment. But those who may wish to imitate Sir John in the economical use of seed must not forget the important adjuncts of that system already described, the perfect drainage and disintegration of surface and subsoil, the subsequent manuring of the turnip crop, the corn and cake fed sheep, and the final consolidation of the furrows, by all of which, as far as possible, security is taken that nearly every grain sown shall vegetate. As soon as necessary in spring the crop is hoed by Garrett's horse-hoe, two of which are used on this farm, and by them 20 acres a-day can be got over. Sir John thinks very highly of this implement, not more from the speed and economy than from the efficiency with which it does its work. The wheat crop last year averaged six quarters an acre of very superior quality, and it has hitherto varied with Sir John from four to five and six quarters an acre. Previous to his taking the farm in hand the produce seldom exceeded two or two and a-half quarters an acre.

Adjoining the farm buildings is the farm-garden, a plot of six acres, where vegetables, such as cabbages, mangold, potatoes, &c., are cultivated, chiefly by manual labour, for the consumption of the house-fed stock and pigs. Near this is a pump, communicating with the liquid manure tank, from which, by a hose attached to the pump, the surrounding land, to the extent of 20 acres, can be watered. The hose has been in use for the last two years without being much worn out. It is manufactured by Paterson, of Manchester, and costs 5d. a-foot. The rickyard next demands notice, as a new space, as large as the original yard, has been cleared in order to afford room for the increasing

bulk of the crops. Resting on the outer wall of the rickyard is a light thatched sheepshed, with well-littered yards, into which the ewes are brought for shelter to drop their lambs, and where they remain for a few days till the lambs are strong enough to follow them to the turnip-fold. When the whole of the ewes have lambed the hurdles enclosing the yard are removed, the solid dung is carted out, and the land beneath is then dug and planted with potatoes, for which it is sufficiently manured by the liquid which has penetrated it. The shed, of course, remains for use in the same way in subsequent years. Next the rickyard is the barn, the whole machinery of which is driven by a 10-horse steam-engine, the cost of working which is 2d. an hour for labour and 10d. for coals, or 1s. an hour altogether. A covered gallery extends along the back of the barn, through the length of which the driving-shaft of the engine passes, with pulleys and belts at intervals for attaching the power to the several machines as they are wanted. In this gallery Sir John proposes to erect steaming chests, should he adopt the plan of giving his stock cooked food. The thrashing machine is an inferior one, but it is fitted with an excellent shaker, by Garrett, the double motion of which at once separates the grain from the straw, and causes it to fall lengthways from the machine. It is then passed to a straw-cutter, by which it is cut as required, either into 4-inch lengths for litter, in which state all the litter of the farm is used, or into ½-inch lengths for food, a hopper from each side of the machine carrying the respective kinds into separate compartments of the building beneath. A corn and cake bruiser and turnip-cutter are all attached, when requisite, to the shaft of the steam-engine. Immediately opposite to the barn-door is a high, open shed, in which straw is stored dry. One side of the square is the implement shed, in which every implement not in use is kept under cover, and it is proper to mention here that Sir J. Conroy has disposed of all his waggons and adopted Crosskill's one-horse carts, having fully persuaded himself, after trial of both, that there is no comparison in point of economy of labour between the two, this being a level part of the country, with good roads through the farm. The more intricate machines are kept under lock, the house being provided with shelves, on which the different parts of the machines not required for the particular work in hand are carefully arranged. Adjoining this is a carpenter's shop, and, at another part of the buildings, a smithy. The farm-stable has at one end of it a harness-room, well lighted, where all the cart and plough harness is kept, and which is cleaned every Saturday afternoon. Water is supplied by pipes to the stable and harness-room, and indeed to every part of the farm buildings. The fattening oxen are kept in loose boxes, under cover, with a passage before them for the convenience of the feeder. Each box is supplied with water, all soft water, which Sir John rightly considers of much importance to the thriving condition of his stock. The centre compartment of the building is occupied as a store for preparing the food, cutting turnips, mixing meal, cake, &c.—the "kitchen," as it is termed. The next yard is the great feature of the

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in-door management—the pig establishment—upon which great attention is bestowed. It should have been mentioned before that the only things sold off this farm are live stock and wheat, everything else, including the barley, being consumed on it. Of course, when a fine malting sample of barley is produced it is sold, and an equivalent quantity of feeding barley bought to replace it. Besides this Sir John buys a large quantity of cheap grain and oilcake for his stock. He endeavours to fatten, every year, as many hogs as he has acres, and has therefore always on the farm between 300 and 400, 80 of which are in the fattening pens to be finished. The only food they receive is barley-meal and water, a “kitchen” being conveniently placed for each pig-yard, with a trough sunk in the ground into which the requisite quantity of meal is put among water, in the evening, for the morning’s feed, and the trough again filled in the morning for the evening’s meal. Each pig is calculated to consume about ten bushels of barley in the course of feeding, that is, from its birth till it is sent off fat. The 80 fattening pigs are kept in three yards, with a shed, all well littered with cut straw. There are many other interesting points of detail which we have not space to enumerate. The houses are all spouted to carry off rain-water, and every particle of liquid as it escapes from the feeding-houses is secured in drains and carried to the tank. An eating-room, with benches and a table, is provided for the people to eat their midday meal, in which there is a fire for cooking, and a washhand basin in the corner, with water laid on, which is regularly used at night after work is over. The same orderly precision which regulates all the departments of the farm is preeminently displayed in the management of the farm servants. These are engaged by the week, the present rate of wages being 10s. They are paid every Saturday in small silver, so that they may have no necessity to go for change to the public-house. A serious fault is never passed over (about which rule, however, we desire to express no opinion); no high words or abusive language is permitted to be used to any person engaged on the farm; but, should any misconduct occur, or any serious neglect of duty, the offender receives with his pay on Saturday a notice that his further services are dispensed with. All extra time is paid for, and every man made to feel that, while the exact performance of his duty is required, he is at the same time treated with perfect fairness. We can testify to the intelligent appearance of the men, and the cheerful *esprit* with which they seemed to be animated.

Such is the style of farming adopted by a gentleman bred in the camp and the Court—a farmer of four years’ practice, but of many years observation; who, notwithstanding all the outlay he has made, finds the business remunerative. We have been thus minute in our description in the hope that other country gentlemen, now compelled by necessity to look strictly to their own business, may be tempted to take a lesson from Sir John Conroy, and to learn from him how much healthful excitement is to be obtained by personal attention to the business of farming.

The farming of the northern division of Nottinghamshire is in many respects superior to that in the southern part of the county. The land is of a lighter character, less expensive to till, and better adapted for green crops and stock; while it happens to be pitched at a considerably lower scale of rent. Much of the land being of a light sandy nature, two corn crops in succession can seldom be taken with advantage, and against this the chief restriction is imposed on the farmer by his landlord, who does not generally insist on the exact observance of a four or five course. These are the common rotations followed in the district. On a well-managed farm, 500 acres in extent, within a short distance of Worksop, the following details there practised may be taken as an example:—The whole manure is applied to the turnip crop, which comes every fourth year on the best, and every fifth on the lighter part of the farm. 5 cwt. rapeseed, 3 cwt. guano, and 10 loads of well-rotted dung, are all laid in open drills, 28 inches wide, which are then covered by the plough, and the seed sown. Swedes are sown in the middle of May, and grown in the proportion to yellow and white turnips of 70 acres of the former to 40 of the latter. The crop seldom falls much short of 30 tons an acre. White turnips are sown on all the inferior sandy land, on which the sheep are first placed, and the turnips being thus consumed early, the land is prepared and sown with wheat. As many bushels an acre of wheat of good quality can be got on this description of land as of barley, for which it is not good enough. On the lightest blowing sand rye is taken. A breeding flock of 400 Leicester ewes is kept on this arm, the produce of which is fattened off on it at a year old, generally before going to grass the second spring. They each get half a pound of oilcake daily, along with turnips, which are all taken up before the fold, and given to them cut, in boxes. Besides the sheep, 30 cattle are fattened every winter, the heifers tied up in stalls, the bullocks fed loose in courts. They receive 4lbs. of oilcake daily, and swedes. The other crops are cultivated in the usual manner, except that in breaking up the light inferior land which has been two years in grass, instead of sowing it with oats, a different plan has been adopted with success for the last year or two. It is broken up in August, and well knocked about, and then sown with white turnips, which are eaten off by sheep, and the land planted in spring with potatoes, without manure. Good sound crops are got, worth three times as much as the oat crop for which they are substituted. The land is then fallowed for turnips in its usual place in the course. Much of this farm is a light poor sand, requiring a large expenditure in manures and cake to keep it in a productive state. It is let at 30s. an acre, inclusive of tithe, and with present prices it does not pay. The average rent of similar land in the neighbourhood does not probably exceed 20s. an acre.

Passing through the Duke of Newcastle’s park at Clumber, where his Grace holds a very large and neatly-managed farm, we proceeded through a finely-cultivated tract to the adjoining “Dukery” at Welbeck, the residence of the Duke of Portland. Going on some miles farther through an undulating light land country, the great feature of which is the extensive woods planted by the present Duke, we reached Clipstone-park, remarkable for its water-meadows, the most gigantic improvement of its kind in England. These, extending to 400 acres, are held in conjunction with an arable farm of upwards of 2,000 acres, and comprise together one of the home farms of the Duke of Portland. The arable land is chiefly a light sandy tract, formerly part of Sherwood forest, which could only be kept in cultivation by a large outlay in manures, or an equivalent such as is afforded by the produce of the water-meadows. It is cultivated

in a seven course, lying four years in pasture, though during the two latter years the pasture greatly deteriorates. Nearly 300 acres are each year in turnips, and as a large stock of cattle and horses are kept constantly in the yards, summer and winter, chiefly on the produce of the meadows, sufficient manure is made to admit of an application of 30 tons to each acre. No artificial manure is purchased, but with this dressing of good dung, great crops of turnips are grown, 40 tons an acre of swedes being reckoned nothing uncommon. On some heavier land, where beans are cultivated, we may mention that three rows are sown pretty close to each other, with a wider interval at every third row to admit the horse-hoe. After the beans have flowered, men are sent along these wider intervals with hoes, with which, taking the three rows at a blow, they very speedily and cheaply shear off the tops of the beans. This prevents the *aphis* from effecting a lodgment, and is found to protect the crop from the total destruction which in some seasons has overtaken it through the devastating attacks of this insect.

The water-meadows extend about seven miles in length along the sloping bank of a valley, through the bed of which runs the little river Mann, its opposite bank for a considerable part of the way rising abruptly from the stream, covered with woods, some of recent, some of older date. The road winds along the valley, and nothing can be more refreshing to the eye than the constant succession of green meadows glistening with the trickling water, or covered with flocks of ewes and lambs browsing on the luxuriant herbage. Formerly this rich and beautiful tract was a succession of barren hill-sides, covered with gorse and heather, the bottoms a swamp of rushes, the haunt of the snipe and the wild duck. By catching the stream as it leaves the town of Mansfield, carrying with it the whole sewerage of the place, and confining its waters within a new bed at a higher level along the hill-sides, the means of irrigating this extensive tract were obtained. The ground was then thoroughly underdrained, cleared of inequalities, and laid out in the most perfect manner for letting on and taking off the enriching waters. These, after flowing over the surface of one side of the valley, are received into a brook, from which, some miles farther down, they are passed over meadows on the opposite side of the valley. At all seasons of the year the waters are laid on the meadows with the best effect. The flock of Southdown ewes, beginning to lamb in October, is immediately placed on the rich grass; at Christmas the lambs are ready for the market, and continue to be sent off during the early months of spring at the period when they fetch the highest price. As one meadow is eaten bare the flock is transferred to another, the water being then laid on to the first. When the clovers and pasture of the adjoining farm are ready, the flock is removed to them, and the meadows shut up for hay, or mown in succession for forage to the horses and cattle which are kept in the farm-yards during the summer. Two cuttings are yielded in the season, besides what remains to be pastured with sheep and cattle in the autumn. The annual value of the produce is estimated at from £10 to £12 an acre, and the whole expenditure from first to last has exceeded £40,000. This great agricultural improvement is justly regarded as the pride of Nottinghamshire, unrivalled as a work of art in irrigation, and in its cost worthy of the liberality of a wise and patriotic nobleman.

Crossing the county from the town of Mansfield towards Southwell we pass for some miles through an open heath, part of the ancient forest of Sherwood, still unenclosed. It is a succession of undulating eminences, covered with short heath and shorter grass, here and there some furze bushes, and occasionally a stunted oak. Beyond this a tract of very light sandy lau¹ has been

enclosed from the forest, divided into small fields by very thriving thorn hedges. A few miles farther on we reach a district of clay farming, the system on much of which has hitherto been two crops and a fallow. The land, being imperfectly drained, undergoes a naked summer fallow, on which, in the autumn, wheat is sown. This is followed by beans, sometimes drilled, sometimes broadcast, but very frequently, as we were told, so foul at harvest that it is difficult to say whether the beans or the weeds are the strongest. Very little stock is kept, and of course very little manure, and that of inferior quality, is made. Here, however, we found an instance of well managed clay land, some details of which we give, as they exhibit a rational method of dealing with this difficult kind of soil which may possibly be instructive. The farm of Mr. Parkinson, of Leyfields, on the estate of the Earl of Scarborough, contains about 300 acres of clay land, 70 of which are in meadow and permanent pasture. The rest of it is divided into 16 fields, as nearly of equal size as possible, which are managed in two six courses and a four, thus—(1) turnips, (2) barley, (3) clover, (4) wheat; then (1) turnips, (2) barley, (3) Italian rye-grass and white clover pastured, (4) ditto, (5) oats, (6) wheat; then (1) turnips, (2) barley, (3) Italian rye-grass and white clover cut for hay and feeding and then dunged, (4) ditto pastured, (5) oats, (6) wheat. Of the 16 fields there are thus, annually, three in turnips, five in clover and pasture, three in wheat, three in barley, and two in oats. The farm was first thoroughly drained with tiles, and then divided by hedgerows into square fields of nearly equal size. Immediately after the wheat is reaped the ground is slightly stirred to encourage the vegetation of annual weeds, and in that state it is left till the wheat sowing is completed. The dung of the previous winter, which has been all kept for the purpose carefully covered with a layer of earth, is then laid on the ground at the rate of twenty loads an acre, and ploughed in. In this state the land remains untouched till the spring seed time is completed, when the first favourable weather is seized for cross ploughing. It must be remarked that the soil is of that stiff clayey nature that the utmost caution is necessary to prevent it being "poached" or becoming cloddy in spring, the whole success of the turnip crop depending on this. It is, therefore, ploughed with two horses in length, to prevent the tender surface soil being trodden. After lying exposed for some time, it is again ploughed in a contrary direction, the horses still walking in line; and if the weather is favourable, and when the ground has become dry enough to bear them, it is well harrowed, and if necessary rolled. But great care is taken not to put the horses on the land to harrow until it has become dry below, as however fine they might make the surface with the harrow, they would do great injury by *fastening* the ground beneath. This preparation is usually sufficient, though occasionally a fourth furrow is given. When this is accomplished, as early in May as possible, the land is drawn into ridges 27 inches apart, on the top of which the turnip seed is sown with a drill, which at the same time deposits beneath it a layer of ashes, soaked in liquid, at the rate of 20 quarters an acre. The seed falling upon this moist bed springs at once, and the chief difficulty in clay land, that of getting the small seed of the turnip to strike, is thus completely obviated. This is followed by a vigorous growth, the thread-like roots penetrating through the now loose and tender land, and finding in every part of it the nourishment which was laid on in the shape of dung during the previous autumn. In the autumn the turnips are taken up and removed for consumption in the yards, dry weather or frost being chosen for taking them off the ground. The barley is sown in spring, the same care in ploughing dry being exercised. Clover and

other seeds are sown in the usual manner, red clover coming only once in 16 years, and never missing a plant. The red clover is mown once or twice as may be necessary. One field of Italian rye-grass and white clover is pastured both first and second year, the other is cut for soiling and hay the first year, and, after getting 10 loads an acre of dung, is pastured the second year. Wheat is sown after red clover, the land being ploughed deep by three horses, with a plough provided with a broad skim, which shears off the entire surface, turning it into the bottom of the previous furrow, where it is covered up by the advancing plough. The ground is then harrowed and the wheat seed sown by the drill. Where the land has been down two years in grass it is ploughed in spring with the same three-horse plough and sown with oats. In autumn it is again ploughed, and turns up very mellow, the roots of the grasses now decayed being brought up again to afford nourishment to the wheat, which is then drilled in the usual manner. Under this mode of management the land is kept very clean, and all the heavy operations are performed at the season when least injury can be done to this tender soil. No artificial manure whatever is purchased, and the crops average 20 to 30 tons of swedes, 40 bushels of wheat, 40 bushels of barley, and 64 bushels of oats per acre. No turnips but swedes are sown except on the headlands, and a small portion on the ground where tares for the horses had been grown. The burnt ashes are prepared by digging up the corners of fields, and close to the roots of the hedges where the plough cannot work—the sods, full of vegetable matter, taken from which, after being dried in the sun, are burnt in large heaps with the trimmings of hedges to keep them on fire. By close attention these heaps are burnt completely through, and the ashes are then drenched with liquid from the manure tanks. In this manner no waste ground is lost, and the hedge trimmings are well worth the cost of keeping the hedges in order. A flock of 200 Leicester ewes is kept on the farm, the produce of which is sent off to another farm as soon as they are weaned. About 50 cattle are fed during the winter, each receiving 4lbs. of oilcake daily, and swedes. A few cows and 8 to 10 work horses are also kept on the farm. The whole liquid from the feeding yards and houses is carefully caught and preserved in tanks. Watering places for the stock are provided in every field by a simple arrangement of the main drains, and several of the meadows are irrigated in winter by a small stream which runs along the bottom of the farm. The whole of these improvements have been executed by the tenant at his own cost, though he has no lease, and holds only from year to year; yet such is the mutual confidence subsisting between landlord and tenant here that he prefers to be so than under a lease, his rent being fairly and moderately charged.

In the neighbourhood of Nottingham much of the land is in pasture for supplying the town with dairy produce, and the advantage of water carriage for manure is enjoyed by the farmers on both banks of the Trent. The best land here lets high, from £2 up to £4 an acre. Beyond the immediate influence of the town the rents vary from 35s. to 45s. an acre, inclusive of tithe. The land being naturally rich it yields large crops, but the management generally cannot be commended either for neatness or industry. On many estates there are no restrictions as to cropping, and we had great difficulty in ascertaining what the usual course of husbandry was. On one large farm which we visited we found it common to take turnips, barley, seeds, wheat, oats, wheat (manured). The wheat was said to average 40 bushels an acre, oats often 80 bushels, and barley when grown between the two wheat crops, which it often is instead of oats, as much as 65 bushels an acre. The whole of the work horses, 20 in number, are under the charge of one

man, the waggoner, who feeds them all himself, and has a number of boys at 8d. a day to clean them and work them in the fields in plough or harrows under his eye, he taking one pair of the horses and obliging the boys to go the same pace as himself. This is certainly the most short-sighted economy we have yet met with. It is pleasant to turn from such management to that of Mr. Paget, of Ruddington Grange, four miles south of Nottingham, who here farms about 300 acres of his own property. This farm was all closely tile-drained many years ago, and has been for a considerable period in a high state of cultivation. A large dairy stock, for supplying Nottingham with milk, is kept, 50 acres of old grass surrounding the house affording them pasture in summer, and several water meadows at the lower part of the farm yielding hay for them in winter. The rest of the land is kept in a constant succession of crops; a green and white crop always alternating in the following manner:—turnips, wheat, and barley, clover, and Italian rye grass (10lb. red, 4lb. white, and 1 peck Italian); wheat, mangold wurzel, wheat, beans, wheat. Every green crop except the clover is manured heavily—the

Turnips receiving 20 load of dung and 15 cwt. shoddy per acre.			
Mangold	" 24	" 20	"
Beans	" 10	" 6	"

The swedes average 24 tons an acre, the mangold 30 to 33, and better crops of wheat are always got after the latter than the former, especially if the mangold leaves are ploughed in for manure; 46 bushels of wheat, 65 to 68 bushels of barley, and 42 bushels of beans are the average crops. Shoddy, the refuse woollen rags of the shoddy cloth manufacture, costs about 40s. a ton. The corn crops are all drilled and repeatedly hoed by Garret's horse hoe, which Mr. Page holds in high estimation. Nor has he ever observed that spring hoeing has been injurious to his wheat crop, as we found it complained of in some parts of Norfolk and Lincoln. When he first began to take wheat so repeatedly off his hand, he was told by experienced neighbours that that could not last long, and that his crops would year by year become less productive. The very contrary has been the case, the crops becoming more luxuriant; but now corrected in their tendency to produce too much straw by being top-dressed with 2 cwt. of salt, which is sown broadcast over the wheat in spring. In 15 years one field has borne eight crops of wheat, none of which had been less than 5½ quarters an acre, and one year the average was 7 quarters. Neither the quantity nor the quality of the produce has in the slightest degree fallen off. Fifty cattle are annually fattened on this farm, and 150 barren ewes, bought in August, are sent off fat in March. The principal stock, however, is from 48 to 50 cows, that number being kept always giving milk by fattening those which are dry and substituting others fit for the dairy. In winter they receive 4lb. oilcake each daily, besides roots. Swedes early in the season, and mangold in spring. As soon as the grass is ready they are turned out to pasture, and then receive no other food. The whole produce in milk and butter is sent daily to Nottingham, and realizes £100 a year.

(To be continued.)

A PLAN FOR FARM-BUILDINGS.

BY J. HUDSON, OF CASTLEACRE.

In thus attempting to offer an opinion upon the construction of farm-buildings, I feel I may be deficient in the ability to frame an essay in eloquent language; but if a life devoted to practical farming can furnish a plain unvarnished statement of what, from experience, I find is required in a farm premises, then I hope the plan I am about to submit may be found advantageous to the tenant farmer.

Presuming the plan required is for 300 acres of arable land, I would first premise that in the selection of the site for buildings, it would be advisable to have them placed, as nearly as possible, in the centre of the occupancy, both for the advantage of carrying the corn to be threshed, and a portion of the root crops to the cattle yards, as well as the carting the manure from the yards to the fields, and also the economy of time in the men and horses having only a short distance to go from the stables to their work in the fields. Another very important thing is the supply of water for the cattle, and also for steam-power, should it be used upon the premises, in which case large expensive barns are not required to be built.

It may be thought that the accompanying plan is larger than is necessary for a farm of 300 acres; but I consider it good policy on the part of the landlords of England to provide their tenants with ample accommodation in the way of farm-buildings, to enable them to cultivate the land highly, so as to grow as heavy root crops as possible; and I never knew a farmer having capital sufficient, who would allow a good grazing yard to be without stock during the grazing season.

Farm-buildings are frequently too much crowded together for the sake of being considered compact; and I would by no means recommend the yards opening one into the other, as there is great liability of the cattle getting together and injuring themselves: the possibility of this is avoided by the plan I have drawn out.

The cattle-yards should front the south; and it will be seen by the plan that the stables, cart-shed, &c., are on the south side of the long court-yard; between them and the cattle-yards the cold winds of winter will be sufficiently kept out, and yet the warmth of the sun will be admitted to the grazing yards, which is a great advantage, the court-yard being 60 feet wide.

The cattle-yards are 64 feet square, including the sheds, which are 16 feet wide; so that each yard

will hold from 12 to 15 head of cattle, and some of the sheds might easily be fitted up as loose boxes, if required, at a small expense.

In the county in which I farm it is usual, upon almost all large farms, to have a field barn and grazing yards for the accommodation of the distant part of the land, by which means much labour and carriage of manure are saved, and 200 or 300 acres of that part of the farm can thus have farm-yard manure applied to it, which would seldom have it were it not for the extra premises.

Respecting the cart horse stables care should be taken that they are well ventilated by a cupola or two over each stable; these may be made of zinc or galvanised sheet-iron, and in the centre of each outer door should be an iron slip frame 18 inches square, to admit air if required, and windows to the south, of strong agricultural glass; also a drain from the centre of each box to the sewer, to convey the liquid manure to the tank, No. 26.

The keeping of cart horses is a very important item in the economy of the farm; they require at all times to be in good condition, and always ready to do a good day's work.

Each horse should have his loose box fitted up with iron manger for chaff and corn, another for cut hay, and an iron trough for water; by this means each horse would have the quantity of corn allowed by his master, and not just what the carter chooses to give him.

Having said thus much, I will now endeavour to explain the buildings in rotation.

I will suppose the farm-house to be placed some 40 or 50 yards on the east side of the farm-yards. On entering the court-yard on the right hand are the piggeries, No. 1.

No. 2, a house for bull.

No. 3, cow house or milking house; a door to the east from the farm house.

No. 4, is a calves' pen.

No. 5, cow yard with open shed.

No. 6, yard for young cattle, or for grazing, with open sheds.

No. 7, 7, hay house and straw house.

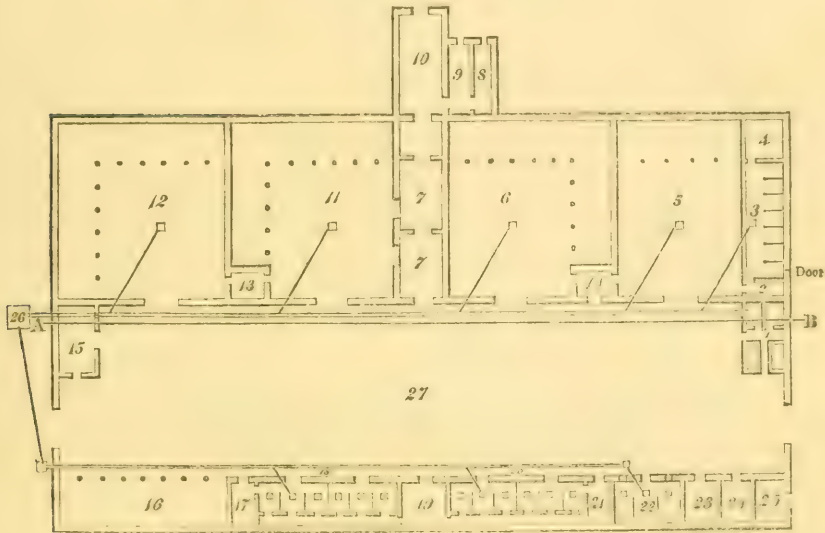
No. 8, 9, coal house and engine house.

No. 10, threshing house, with floor above for threshing-machine and straw-shakers, the grain falling into a dressing-machine below. And here it may be proper to say a few words upon this important part of the farm-buildings.

PLAN OF FARM BUILDINGS, FROM 250 TO 300 ACRES—ESTIMATED COST £1500.



SOUTH ELEVATION on line A. B.



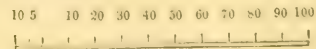
REFERENCE.

No.

1. Pigs' House.
2. Bull House.
3. Cow House.
4. Calf Pen.
5. Cow Yard.
6. Young Cattle.
7. Hay and Straw.
8. Coal House.
9. Engine House.
10. Barn.
11. Cattle Yard.
12. Do. Do.
13. Turnip House.
14. Do. Do.
15. Carpenter's Shop.

No.

16. Cart Shed and Granary.
17. Harness House.
18. Cart Horse Stable.
19. Corn House and Granary.
20. Cart Horse Stable.
21. Harness House.
22. Nag Stable.
23. Gig House.
24. Wheat House.
25. Fowls' House.
26. Reservoir—Liquid Manure.
27. Yard.



In this improving age it would be unwise to recommend the building of large and expensive barns, the more especially as steam power is getting into such general use. I can speak practically upon this point, as I am now using two steam-engines upon my farm. One a stationary engine, which, besides driving a threshing and dressing machine, works an oil-mill, for the purpose of making linseed cakes for my cattle, and also grinds the inferior or tail-corn

for them; the other is a portable engine, which only drives a threshing machine and straw shaker at an off barn in the centre of 300 acres of arable land, where 60 head of cattle are annually grazed in the yards upon Swedish turnips, mangold, and linseed cakes.

The corn is threshed for one-third less than what it would cost were it done by horse-power, and the horses can be more profitably employed upon the

farm at other work: the saving is very great, the cost of moving, threshing, and dressing a stack of mown wheat by steam engine, being $10\frac{1}{2}$ d. per qr.; and the same by horse power, 2s. 6d. per qr.

The expense of moving in and threshing and dressing a stack of mown wheat, containing 90 coombs, by the stationary engine, is $5\frac{1}{4}$ d. per coomb of four bushels, as may be seen by the statement here given.

STEAM-POWER.

Cost of moving a stack of mown wheat, threshing and dressing 90 coombs:—

	£	s.	d.
2 men, 1 day at stack.....	0	3	4
2 men, 1 day loading.....	0	3	4
1 man, 1 day raking loads, binding, &c.	0	1	8
1 man to feed machine.....	0	2	6
1 man attending to corn.....	0	1	8
1 man unloading wheat.....	0	1	8
2 men putting sheaves to feeder.....	0	3	4
1 woman putting out straw.....	0	0	10
2 men after straw.....	0	3	4
1 man and 3 women dressing.....	0	4	2
1 man driving engine.....	0	3	6
Half ton of coals.....	0	10	0
	£1	19	4

Being $5\frac{1}{4}$ d. per coomb.

I have another barn, at which is a horse-power threshing machine for six horses, and the cost of moving in a stack of mown wheat containing 90 coombs, threshing and dressing the same, is 1s. 3d. per coomb of four bushels.

HORSE-POWER.

	£	s.	d.
5 men at stack.....	0	8	4
4 men in barn.....	0	6	8
1 man $1\frac{1}{2}$ day feeding.....	0	3	9
1 man $1\frac{1}{2}$ day driving horses.....	0	2	6
2 men $1\frac{1}{2}$ day in barn.....	0	5	0
1 lad $1\frac{1}{2}$ day untying sheaves.....	0	1	6
5 women to shake straw.....	0	6	3
2 men $1\frac{1}{2}$ day after straw.....	0	5	0
3 men $1\frac{1}{2}$ day to riddle and clear away corn.....	0	7	6
6 men and 4 women 1 day dressing....	0	13	4
6 horses 5 hours threshing at 3s.....	0	18	0
6 do. 5 „ do. 3s.....	0	18	0
do. 5 „ do. 3s.....	0	18	0

£5 13 10

Being 1s. 3d. per coomb.

Nos. 11 and 12 are two grazing yards 64 feet square, including the shed, which is 16 feet wide.

Nos. 13 and 14 are turnip-houses opening into each yard, from whence the cattle can all be fed.

No. 15 is intended for a carpenter's workshop, which is a very requisite building.

No. 16, the cart-shed with granary over; the granary to be in the roof 14 feet wide.

No. 17, house for harness, &c.

No. 18, cart-horse stable divided into six loose boxes, each box fitted up with two iron mangers and iron water trough.

No. 19, corn and chaff house 20 feet square, with granary over for horse corn. Here the food for the horses can be prepared by the yard man, and the horses fed by him at the head of the horse-boxes. By this plan each horse would have exactly what corn the farmer thinks proper to allow him; but I would by no means recommend the litter to remain more than one day in the horse boxes, but cleaned out every day and put into the cattle yards.

The more the horse manure is mixed with that of the grazing cattle the better; and the small expense of carrying it into those yards daily will be amply repaid by the improvement in the quality of the manure.

No. 20, six more loose boxes. The whole of the boxes should be divided 4 feet high with board 2 inches thick, and then 2 feet more with strong rails of either oak or elm. It will be observed that three of the horses will enter at one outer door, one going into his box to the right, another to the left, and the other the centre box.

No. 21 is another harness-house.

No. 22 is the nag-horse stable, fitted up with two stalls and a loose box.

No. 23, gig house.

No. 24, house with copper and furnace for cooking and steaming food for pigs, &c., and for preparing seed wheat, &c.

No. 25, house for fowls.

No. 26, liquid manure tank—the drains from the yards all emptying themselves into it.

I have thus enumerated every building required for a farm of 300 acres of arable land; indeed, it might suffice for nearly 100 acres more, unless an extra capital was employed to grow heavier root crops, and by that means keeping a larger number of cattle. As a matter of course, the buildings should be all fitted up with cast iron water troughs to convey the water from the eaves, so as none of the water from the roofs of the buildings be allowed to fall upon the manure in the yards: too much attention cannot be paid to this.

An excellent plan is now being adopted upon a large estate in this county of using deal board instead of rafters in all the cattle sheds and stables, where they do not exceed 20 feet in width. Three purlins or side pieces, are used instead of one as formerly, and these are clad over with board 1 inch thick from the ridge to the eaves, and the slate is fastened to these boards, by which means neither rafters nor laths are required, and the slates are never blown off by the wind; nor can the rats or birds interfere with the roofs of the buildings.

Stone should be used for the bottoms to set the

oak posts upon in the cattle sheds; the cost is less per foot than oak, and it will last must longer.

The cattle sheds being 16 feet wide can easily be converted into loose boxes if required, having ample room for a path 4 feet wide, so as the cattle can be fed at the head without going into the boxes. In either case they should be fitted up with cast iron mangers attached to two upright posts, so as they may be raised up a few inches at a time, as the manure increases in height in the shed or boxes.

The yard gates ought to be of the best oak and made very strong, and not less than 5 feet high.

The cost of building this farm premises may be thought excessively high, but the estimate is made upon the understanding that the very best of materials are to be used, as well as the best of workmanship. Where the bricks can be made upon the farm, and English fir used, the cost would be much less in the first instance; but foreign timber would be cheaper in the end. It is intended to have all the posts, door-jambs, &c., which are exposed to the weather, of English oak.

Specifications of Farming Buildings for a Farm of 300 Acres.

The building to be built with bricks, and covered with slates; roofs, &c., Memel timber; oak jambs, posts, &c.; stone bottoms to the story posts of lodges and sheds.

All the yards and buildings to be drained, and the water carried off by a common sewer into a reservoir for liquid manure. The yards to be laid with a fall from each side to the centre to a tank, with grating thereon.

The piggeries to be partitioned into folds, with paved floors; bull and cow houses, and calves' pen, to be paved and fitted up with stalls and feeding manger.

The sheds in cow and cattle yards to be fitted up with feeding-cribs. The story posts to stand on stone bottoms.

Cart shed, story posts standing on stone bottoms. Granary to be made over the waggon lodge in the roof, 14 feet wide.

Cart horse stable to be made with six loose boxes in each; to be fitted up with iron mangers, rack, and water trough; to be fed at the head. The stores to be kept in corn house No. 19, with a granary over the same.

The riding stable to be fitted with two stalls, and one loose box.

The barn to be built with two floors; the first floor to be of brick, and the second floor to be boarded for threshing and dressing corn, &c.: the threshing to be done by machinery, worked by steam or horse power.

Estimated expense, £1500.—Journal R.A.S.

EXAMINATION OF THE COMMERCIAL VALUE OF HUMAN EXCRETÆ AND PEAT CHARCOAL MANURE.

BY J. C. NESBIT, ESQ., F.G.S., F.C.S., ETC.

Public attention has within these few years been strongly directed to the necessity of preserving and making use of those fæcal matters, which, though highly valuable as manure, have hitherto been allowed, from various causes, to run to waste.

Though no one has denied the value of human excretæ as manure, yet, as far as I am aware, no attempt has yet been made to determine by analysis their exact market value, and thus to compare them with other manures.

The subject was thought of sufficient importance to warrant our undertaking in the laboratory an investigation of the subject.

By weighing the excretions of one person for some time it was found that the average weight of solid fæces was 7 to 8 oz. avoirdupois, and the urine 3½ lbs. per diem. The weight of the latter will of course vary with the quantity of water drunk, the state of the air, &c.; but the solid materials given out in it daily will be nearly the same. The annual amounts will, therefore, be nearly 1½ cwt. solid excrement, and 11 cwt. of urine.

The following tables show the composition of these substances, as determined by Messrs. Bailey and E. Cottingham:—

COMPOSITION OF THE SOLID AND LIQUID EXCREMENTS OF MAN IN THE NATURAL STATE.

	Solid Excrements.		Urine.	
	Per Cent.	Per Ton. lbs.	Per Cent.	Per Ton. lbs.
Moisture	73·25	1641	97·09	2175
Nitrogen	1·94	43	·79	18
Organic matter	22·01	493	1·30	29
Inorganic matter ..	2·80	63	·82	18
	100·00	2240	100·00	2240

COMPOSITION OF DRIED HUMAN EXCREMENTS.

	Solid Excrements.		Urine.	
	Per Cent.	Per Ton. lbs.	Per Cent.	Per Ton. lbs.
Nitrogen	7·25	163	27·14	607
Organic matter	82·29	1843	44·69	1002
Inorganic matter ..	10·46	234	27·14	631
	100·00	2240	100·00	2240

COMPOSITION OF THE EXCREMENTS OF ONE MAN FOR ONE YEAR, AT THE RATE OF 1½ CWT. OF SOLID FÆCES, AND 11 CWT. OF URINE, PER ANNUM.

	Natural.		Dry.	
	Solid Excrements.	Urine.	Solid Excrements.	Urine.
	lbs.	lbs.	lbs.	lbs.
Moisture	123·0	1196·3		
Nitrogen	3·3	9·9	3·3	9·9
Organic matter	37·0	15·9	37·0	15·9
Inorganic matter ..	4·7	9·9	4·7	9·9
	168·0	1232·0	45·0	35·7

From the previous table it will be seen that, exclusive of water, we have 45lbs. of dry matter in the solid fæces, and 35·7lbs. of dry matter in the urine given out annually. The following table shows the composition of the mixed materials dry :

COMPOSITION OF THE MIXED EXCRETÆ DRY.

	In Annual Amount of 80·8lbs.		Per Cent.	
	lbs.	lbs.	lbs.	lbs.
Nitrogen, equal to Ammonia	16·	13·2		16·33
Organic matter		53·0	19·8	65·61
Inorganic matter .. containing Phosphoric acid..	2·67	14·6	3·3	18·06
		80·8		100·00

From a comparison with other manures in the market, it would appear that the value of the 80·8 lbs. of dry solid matter is about 10s. In order to compare it properly with guano and other manures, we must see its composition when it contains 12 per cent. of moisture, the same as ordinary guano.

COMPOSITION OF MIXED HUMAN EXCREMENTS WITH 12 PER CENT. OF MOISTURE.

Nitrogen (equal to 17·42 per cent. of ammonia).....	14·37
Organic matter	57·74
Inorganic matter (containing 2·9 per cent. of phosphoric acid)	15·89
Moisture	12·00
	100·00

In the subjoined table the dried excretæ are compared with rapecake and Peruvian guano. The ammonia in the guano is calculated at 14 per cent., which is about the average :—

COMPARISON OF DRIED HUMAN EXCRETÆ WITH RAPECAKE AND GUANO.

	Rapecake.	Guano.	Mixed Human Excretæ.
	lbs.	lbs.	lbs.
Moisture	195·8	268·8	269·0
Nitrogen equal to Ammonia..	115·4	258·6	322·0
Organic matter	140·0	313·6	390
Inorganic matter	1654·2	938·6	1293·0
containing Phosphoric acid	274·6	774·0	356·0
	43·7	224·0	64·9
	2240·0	2240·0	2240·0

From the previous table it will be seen that the dried excretæ are preferable to the guano and rapecake as far as concerns the ammonia, and superior to the rapecake and inferior to the guano as respects the phosphoric acid. The latter could easily be supplied by bones or coprolites.

Many methods have been proposed for getting rid of the excess of moisture from fæcal matter. Among others Mr. Rogers proposes to use peat charcoal, which not only absorbs water, but also possesses powerful deodorizing properties. Mr. Rogers, by means of a proper machine, mixes two parts of peat charcoal with one of excretæ, and the resulting material is at once ready for use or carriage.

The following is an analysis (by my assistant, Mr. Bailey, F.C.S.) of one of the mixtures made by Mr. Rogers, in his experiments at the Mechanics Institute, Southampton-buildings, in October last :

PEAT CHARCOAL MANURE.

	Per Cent.		Per Ton.	
	lbs.	lbs.	lbs.	lbs.
Moisture		30·66		687
Nitrogen equal to ..		4·89		109
Ammonia	5·92		132	
Organic matter and Charcoal		55·23		1237
Inorganic matter... containing Phosphoric acid ..		9·22		207
	0·63		14	
	100·00		2240	

In order to compare the peat charcoal manure with guano, we will show its composition with 12 per cent. of moisture :—

	Per Cent.		Per Ton.	
		lbs.		lbs.
Moisture		12·00		269
Nitrogen equal to ..		6·20		139
Ammonia	7·5		167	
Organic matter and Charcoal		70·09		1570
Inorganic matter... containing Phosphoric acid ..		11·71		262
	0·8		17	
	100·00		2240	

The peat charcoal manure with only 12 per cent. of moisture, and assisted with some phosphates, would therefore be more valuable than rapecake and nearly half the value of guano.

Agricultural and Scientific School, Kennington, June 20, 1850.

ABSORBENT POWER OF SOILS.

How frequently have we noticed the great difficulty of finding out the original inventor of any new discovery! Either one master-mind threw out an idea which a second took up and perfected, so that it was difficult to whom to award the meed of praise; or, more generally, some two or more minds were working out the same great principles unknown to each other; and that which the first one announced was nothing more than what the other had had at his fingers' ends for years. This truth is strikingly exemplified in the extraordinary facts brought to light by the recent papers of H. S. Thompson, Esq., and Professor Way, in the last number of the *Journal of the Royal Agricultural Society of England*. The two gentlemen—Mr. Thompson first—were (unknown to each other) at work on the most intricate of all questions—the most difficult to comprehend or explain—of the power of soils to absorb certain manurial elements; which fact appears so new in science, that it is, with our present knowledge, difficult to account for. It stands absolutely alone in its baffling all scientific research to elucidate its *modus operandi*, and in its being due certainly to some power, before unthought of, possessed by the soil. It may be remembered by the readers of the *Journal* that we have, as a practical recommendation, strongly urged that *soil* should be used as a vehicle for conveying liquid drainage to the land, instead of using the water-cart or adopting expensive modes of conveying the liquid drainage to a great distance. The reply to this always was that the mass would only arrest the matter in *suspension*, and not affect the most valuable—that in *solution* and combination. The principle of this, however, is first developed by Mr. Thompson's experiments made in the summer of 1845. His object was to examine and illustrate the power the soil possessed of retaining manure if applied during the winter months, and also its power to hold the fixed ammonia accumulated in the tanks of farm steadings. He filtered through the sandy loam of his own farm, six inches in depth, ten grains of sulphate of ammonia and ten grains of sesquicarbonate of ammonia, both dissolved in distilled water, the one not unfairly representing the ammoniacal matter of the tank fixed by gypsum or sulphuric acid, and the other the free ammoniacal solutions of the decomposed vegetable and animal matter of the farm-yard; and he found that after passing through this thin

stratum of soil, only 2·4 grains of the sulphate of ammonia resulted in the one case, and only 1·3 grains in the other. But, when an eight-inch stratum of the soil was used, the whole of the ammonia was detained in the soil. Several other experiments were tried, all tending to the same point; and without at all theorizing as to the causes of this extraordinary property, he arrived at the following sound deductions—like all his remarks, clear, judicious, and discriminating:—

“1. That clay soils might be manured a considerable time before sowing, without loss.

“2. That light shallow soils should not be manured long before sowing; should not be heavily manured one time; and the manure should be kept as near the surface as practicable, without leaving it uncovered.

“3. That it is desirable to deepen the cultivated soil of all light land, as it thus gives it a greater power of holding manure.”

Professor Way, two years ago, on a hint from Mr. Huxtable, that the filtration of urine through a loamy soil completely deodorized it and deprived it of its colour, and from Mr. Thompson, that soils had the capability of separating ammonia from its solution, sets about a series of experiments which are of a very interesting and elucidatory character, as regards the practical bearing of the question; but the deductions he draws, mainly theoretical, on the causes of the phenomenon, are rather of a negative than a positive character. These and the varied phases, some apparently contradictory, we shall advert to in a subsequent paper, and merely carry out for the present the practical character of our observations on the principles contained in the article. First, he subjected stinking tank water to filtration through 24 inches of a light loam, and the moisture at the foot of the tube was perfectly free from smell, and a mixture of this soil and white sand allowed the percolation of water through it quite clear and perfectly free from ammonia. Nay, more: clay seemed to have the effect of preventing the urine from running through its putrefactive fermentation; indeed, it appears that large quantities of urine passing through a comparatively small quantity of clay loses its tendency to run through that process.

The most interesting of the professor's experiments, however, was in the sewer water from a

London sewer. The analysis of this water was first of all taken, and its constituents were thus described :—

	Grains and tenths.
Organic matter and salt of ammonia..	301'82
Sand and detritus of granite from the streets	20'69
Soluble silica	12'51
Phosphoric acid	10'44
Sulphuric acid.....	14'73
Carbonic acid	15'59
Lime.....	24'53
Magnesia	2'87
Peroxide of iron and alumina.....	6'20
Potash	48'13
Soda	1'51
Chloride of sodium	33'24

Grains in the imperial gallon.... 492'26

This was passed through six inches of soil, and one gallon of water was passed through 4lbs. of the soil. The water when examined was found to contain per imperial gallon, in grains, of—

Organic matter destitute of nitrogen..	60'58
Chloride of sodium	52'73
Chloride of magnesium	0'67
Chloride of calcium	8'89
Carbonate of lime	104'98
Sulphate of lime	17'49
Loss	3'16
	248'50

The manifest difference in the fluids will show the great power of the soil to extract and detain the manurial constituents of the sewage water. The

ammonia is separated from the rest of the organic matter to the last fraction; the phosphoric acid is separated from its bases, and so is part of the sulphuric acid and all the potash; so that in fact the soil had selected and retained those very principles of the sewer water which science has decided to be the most valuable for the purposes of manure, and this shows the utility of saturating our soil and compost heaps with tank liquors in order to have the power of possessing a concentrated and home-manufactured guano at pleasure. The extent of the absorption Mr. Way speaks of is a weight of sewage water more than equal to the weight of the soil in the experiment he tried, and closes with the somewhat startling fact that a soil saturated to the extent he saturated the soil in question, of ten inches only in depth, would take 1,000 tons, or 224,000 gallons of undiluted water, and the quantity of the matter of guano detained would be three tons, or twenty times the quantity usually employed per acre.

Now it must be borne in mind that the attraction, or affinity, or whatever it may be which holds the matter detained, is one of a severe and powerful kind; for, according to the experiments made, pure water may be poured through the soil so charged without dissolving out substances otherwise extremely soluble. Possessing such a power, and such a principle to work out in practice, we ask, is there any necessity for what we have so often found fault with--drugging the manure? We shall see. —Gardeners' and Farmers' Journal.

SPADE HUSBANDRY AND STALL FEEDING.

The annual meeting for the distribution of the prizes given by the Earl of Dartmouth, to competitors in spade husbandry, &c., was held in the National School Room, at Farnley Tyas. Although this meeting was held some time since, yet the reports then read possess sufficient interest to warrant us now in giving them insertion. These prizes are eagerly contested for, particularly by the numerous spade-farmers and field-gardeners of the neighbourhood, and it is deemed by them a great honour and a proof of superior skill to win a prize. As usual on these occasions, a great number of persons attended the meeting, and showed the warmest interest in its proceedings.

The Rev. CUTFELD WARDROPER, Incumbent of Farnley Tyas, said—My Friends, it is with much pleasure that I again meet you on an occasion like the present. In presiding over a meeting for the encouragement of industry, I consider I am but fulfilling a most important duty. It was a sense of duty that induced me, when first coming amongst you, to undertake the office of president of your committee; and the more I see of the working of the plan which (under the kind auspices of the noble earl, our patron) we meet together to further, the

more I see cause to admire the spirit that dictated a measure so fraught with benefit to my industrious parishioners, and the more I feel called upon from a sense of duty to come forward with my own feeble aid. With such a patron, and so able, zealous, and kind a fellow-worker as my friend on the right (Mr. Nowell), whose valuable services in the cause need no eulogium from me here, nor would he sit easy under an attempt on my part to give him but his just meed of praise—with such a supporter as my friend, and such a patron as the Earl of Dartmouth, I should indeed be faint-hearted if I was discouraged at the thought of my own little experience in these matters. But although I have not been long resident with you, I have seen enough to convince me that the labours of the committee have not been in vain; no, they have by no means been fruitless, and we ought all to rejoice, and more particularly the clergy, that a means has been found to add to the comfort of the cottage, as well as to due economy in the farm. We ought all to rejoice, I say, at the opportunity afforded us of contributing to the happiness of those around us, and by force of example to the national good. There is one thing I must not omit to advert to, as it more especially concerns me as your minister, who as such may not by some persons perhaps be thought acting in his true capacity by over-

attention to secular affairs. *I allude to the school farm.* I believe that the mode of training which has been adopted here and in other industrial schools will ultimately be proved most salutary. By training children in the science of field gardening (for we must no longer consider gardening as a rude art), we at the same time assist them in their more immediate studies within doors. All observations confirm this; and from the report I hold in my hand, which the master has made, it will appear that the children voluntarily engage in the labour of the school garden with the greatest pleasure, and that refreshed and invigorated by exercise in the open air, they learn quicker and attend to their lessons with more alacrity. I shall read his report, and then I think I shall hardly find it necessary to entreat you, parents of these children, to assist us in our endeavours not only to train up our youths in the way they should go, but that they may not be at a loss as they grow up to gain part at least of their daily bread by the practice of one of the most healthy occupations that man can be engaged in, and which, while it furnishes our food, under God's blessing, ensures also that good health, the chief source of our enjoyment, and is very far from being incompatible with our religious duties. As there are those present who will speak in a way both to interest and instruct you on this subject of daily increasing interest in our manufacturing districts, I shall not take up more of the time of the meeting, but proceed to read the master's report relative to the farm attached to the school where mental and industrial training are united and found to succeed so admirably (applause).

MR. BALL'S REPORT OF THE FARNLEY TYAS SCHOOL FARM, 1848-9.

GENTLEMEN,—I have the honour to present this my first report of the farm attached to the Farnley Tyas School. It being late in the season of last year when we entered upon it, no preparation was made for the sowing of wheat; but in the month of January the first operation was commenced, viz., that of throwing up two-thirds of a rood of ground for the purpose of planting potatoes. This is a plan I never saw adopted before, but the excellency of it is very apparent in the spring at the time of planting, when the ridges having been exposed the whole of winter to the mellowing influences of the frost and winds, the land is in fine tilth for the reception of the seed. One pack of potatoes was planted, and the manure used was $1\frac{1}{2}$ cwt. of the best Peruvian guano, the produce of which has been 10 packs (Hear, hear). In the month of February the ground was prepared, and three double rows of peas planted. Night-soil powder drilled in with the seed; and the crop proved an excellent one. The rows were twenty yards in length, and the produce 12 packs. In the month of March two roods were prepared for oats: the manure used was one ton of lime, the produce 17 bushels of good oats, and a corresponding quantity of good straw (Hear, hear). At the same time 1 rood and 25 perches was dug and prepared, and sown with barley. The manure used was one cart-load of lime; the produce 9 bushels; straw rather light. Fourteen perches were next prepared and sown with carrots, mangel wurtzel, red beet, and turnips; between the rows of mangel wurtzel beans were planted. This is an excellent plan, the beans defend completely the other plants, and a crop is produced on ground which, in other respects, would have been idle. Our carrots and parsnips rather failed, and then directions were given and the ground prepared and sown with white turnip seed. Seven rows were next prepared and sown with Swede turnips, the produce of which has been very good. After the peas were removed, the ground was prepared and planted with Savoy cabbages, and between other rows curled brocoli and cauliflowers

were planted, all of which promise a good supply for winter use (Hear, hear).

In most of the operations of the garden the abler children have been called into use, and it gives me the greatest pleasure to report that at all times the greatest willingness has been shown—no compulsion has been used, but whenever they have been wanted I have always found them most willing; and I have to remark that those boys who are diligent in this little work are the more so in their lessons in the school (Hear, hear); and I feel convinced of late, that with a little arrangement of their lessons on any day when it is requisite to take them out, no loss will be sustained by the boys in the routine of the school business (applause). An account has been kept of their labour, and I am in great hopes that what has been learned and practised in that little plot of ground, will be of use to them in after life (Hear, hear)—that the same taste will go with them into manhood, and that they will embrace the facilities now offered for the possession of garden plots, and they will cultivate such pieces of land with the same pleasure as they do now (applause). I have endeavoured as much as possible not to interfere with school hours, and I am prepared to state that the greater part of their labour has been performed between half-past twelve and two o'clock. In the matter of field gardens or allotments of land to the industrious, too much praise cannot be given, as the advantages of the possession of a small portion of land to one with a family are many. For myself, I can speak as having derived great pleasure at all times from the cultivation of the school allotment, it having given myself and family many hours of pleasant recreation both before and after the school hours (Hear, hear). One half-acre has again been prepared and sown with wheat. Yard manure and night soil have been used. Below is a statement of the produce and expenditure:—

DR. SCHOOL FARM.	£ s. d.	PER CONTRA.	CR.
Oats and barley seed.	0 11 0	18 bushels of oats, at	
One pack of potatoes.	0 14 0	18s. per qr.	2 0 0
Two loads of lime ..	1 5 0	5 bushels of barley,	
$1\frac{1}{2}$ cwt. of guano ..	0 12 6	at 3s. 4d. per bush.	1 10 0
Other seeds.	0 6 0	10 packs potatoes, at	
Hired labour (boys') ..	2 17 0	8s.	4 0 0
My own labour.	2 10 0	12 pecks of peas at 6d.	0 6 0
Rent	1 10 0	Oat and barley straw	2 0 0
		Mangel wurzel, tur-	
		nips, and beans ..	1 0 0
		Cabbages	0 2 6
	£10 5 6		£10 18 6

REPORT OF THE FARNLEY CENTRAL COMMITTEE.

(Read by JOHN NOWELL, Esq., who introduced it with many valuable remarks.)

This committee, in presenting their seventh annual report, have pleasure in stating that, whatever other discouragements they may have to contend against, at least their gratitude is due for a bountiful year, although the potato crop has proved infected with disease to a considerable extent. The same advice, therefore, which was given in their last report must be repeated on the present occasion, particularly to those employed in spade husbandry—to confine their attention more to the growth of other and more nutritive productions, as substitutes for that favourite, but innutritious root. (Hear, hear.)

A spirit of improvement appears to animate our neighbours, and new difficulties would seem but to excite new exertions. We hope and trust that this rare industry in the field and in garden may receive its just reward.

In referring more particularly to spade husbandry, whether practised in the field or garden, experience has fully proved

that the spade is an instrument not to be despised, while stall feeding of cattle is acknowledged *now* to be no chimerical plan, nor unprofitable to the occupier. (Hear, hear.) Manual labour by the spade, as all of us here can testify, has greatly contributed to the comfort of very many families, and at the present time many rejoice in possessing a store of provisions for the winter—some 18 to 25 stones of flour, or oatmeal, and 8 to 12 packs (of 240lbs.) of potatoes, and in not a few instances a pig is fattening, and in some cases two of these “cottage comforters” have resulted from field-garden culture. (Hear, hear.)

As this useful animal generally thrives best with the cottager, and is really found almost indispensable in the cultivation of the rood-garden, it is most desirable that every small occupier should possess one. It is therefore earnestly recommended to the several local committees in connection with us, that they should encourage the labourers to form clubs among themselves, for the purpose of more easily procuring their swine. That each member make a weekly contribution of 4d. or 6d., to be collected monthly, and paid to some responsible person, the treasurer, to form a fund; and this fund, raised by degrees, and little felt in the raising, may then be laid out in one sum, and thus every member may be supplied with his pig at the cheapest rate. It is perhaps almost unnecessary to remark that by a small addition to this weekly contribution, insurance against loss by casualty or by death might be effected, on the same principle as in the admirable “cow clubs” of the farmers—clubs which have prevented the ruin of many poor tenants (Hear, hear).

The small tenants must be again particularly cautioned not to neglect the chief point of all others—the manuring of their plots, and not to give occasion for censorious neighbours to say with truth, that when once their crops are in and growing, the owners are too idle to weed them. Let not a weed be visible, in any stage of its growth; it steals the food of better plants, and bear this in mind, that “weeds do not help you to pay rent.”

In conclusion, this committee, from what they witness, fees an increased desire to second the endeavours of the noble patron of the society in his benevolent design of encouraging humble industry, and from the great success which has attended their labours they hope he has received unmingled satisfaction. In corroboration of this may be added a summary of what was lately stated in a popular journal by a friendly, but unknown visitor. He states, “That in consequence of the test of the value of the spade labour so rigorously applied in our industrial field, and of the confidence reposed in the accuracy of the results of that experiment, 800 rood gardens are now to be seen within a few miles of this place, cultivated with the nicest care, and principally by manufacturing operatives and their children; and that with great industry the roads are scoured of all impurities, and neighbouring villages cleaned out, and cottage precincts kept free from accumulations of pestilential heaps by troops of juvenile scavengers.” As a sanitary measure the plan then is invaluable, and if carried out extensively would greatly ensure the public health; and may not the entire freedom of this district from cholera, not a single case having occurred, or from typhus fever, which was wont to be the scourge of the people, be attributed chiefly to this cause? But a statistical inference may be drawn from what this writer states of great and national importance. If there are eight hundred rood gardeners with family assistants, and, if *five pounds* can be cleared in this way by each family on cessation of other employment, and without interference with their ordinary labour, then the whole will clear £4,000 a-year—a great boon truly! Hence these 800 individual families have in

themselves a surplus CAPITAL OF EIGHTY THOUSAND POUNDS, which, while they remain unemployed, may be considered inert and latent, unprofitable to themselves, and a loss to their country (applause).

THE ALMONDBURY REPORT.

(BY THE REV. L. JONES.)

The inspecting committee have the gratification to state to the sister committee of Farnley Tyas that they have now upwards of 70 field gardens, that these have been cultivated this year with great industry, and that the conduct of the men has been all that they could desire, while the results are most encouraging.

REPORT OF THE COMMITTEE OF THE ALLOTMENTS BELONGING TO THE EARL OF DARTMOUTH, SITUATE IN THE PARISH OF KIRKBURTON.

Since our last report 22 additional allotments have been added to the number in this township; and although the season was somewhat advanced when possession was obtained, yet we are able to report that nearly the whole of these have been cropped this year under spade labour.

In the latter part of August last, we, together with the Farnley Tyas committee (Messrs. Nowell, Senior, and Leigh) visited and inspected all the allotments, and found them all well cultivated, bearing generally heavy crops, and giving promise of an abundant produce. Several remarks then made by Mr. Nowell as to the method of cropping, and the advantage to be gained by keeping the land and growing crops free from weeds, &c., were well received, and we believe highly appreciated. Though we regret that the potato crop, as far as the allotments are concerned, has been in some respects a failure, yet the corn crops were, as far as we have had an opportunity of judging and ascertaining, very satisfactory. It is a source of great pleasure to us to be able to state that the industry of the several occupants has been highly praiseworthy, and that in the cultivation of their plots of ground they exhibit a visible improvement. From our having often noticed the younger portion of the family engaged in his labour, we feel convinced that it will be a means of fostering and exciting habits of neatness and industry, and we have no doubt that it will create in them those feelings of self-reliance which must tend to improve their present condition, and to adorn their various situations in life.

The mutual good feeling which they had displayed to each other, and the improved temporal welfare of their families, are sources to us of the greatest pleasure, and convince us of their sincerity in declaring that the allotments are of the greatest advantage and interest, both to themselves and their families.

JAMES KENTON,
WILLIAM SUTCLIFFE.

THE LEPTON REPORT.

(BY JOSIE LOCKWOOD AND THOS. IBBERTSON.)

We have great pleasure in informing the Farnley committee that the allotments, amounting to 60 or 70 in our townships, have this year been satisfactorily cultivated, and that very great improvements have been lately made in them; while the conduct of the men has been such as to merit our approbation, and we are persuaded that their circumstances have been much bettered.

The Rev. C. A. HULBERT, M.A., Incumbent of Slaithewaite, gave an account of the progress of the industrial farms, school

and cottage allotments in Slaithwaite and Lingards, similar to that recorded in our last paper in the account of the meeting at Slaithwaite, and in a very excellent speech (much cheered) shewed the physical, moral, and religious effects of spade husbandry, and especially of such meetings as this, "Where the rich and poor meet together, and the Lord is the Maker of them all."

The Rev. R. COLLINS, Vicar of Kirkburton, in referring to the report for his parish, assured the meeting that a very great improvement in the morals and worldly prospects of his poorer parishioners had resulted from the encouragement given to cottage gardening. He now found the cottage ornamented with pictures, fitches of bacon, and a most delightful thing it was to behold them in places where they had never been seen before. He sincerely hoped that the report of the central committee would obtain wide publicity, and that the "pig clubs" therein recommended would be formed in every parish throughout this country. Most grateful was he for the encouragement given by their noble patron to the poor of his parish, by so considerably furnishing them with land (cheers).

The Rev. LEWIS JONES, Vicar of Almondbury, in delivering in the Almondbury report, said that on some former occasions he had told them that they had uneasy feelings in his parish, in thinking that they were rather in the rear of their Farnley sister ("Mother!"). Why, mother, then. But now he had to tell them that they could boast of their seventy field gardens; and he thought he might say, that in cultivation they were not very much behind the Farnley people ("You beat us!" and cheers). And (said the rev. gentleman) you farmers, don't try so hard to keep the land for yourselves—let your poor cottagers have a bit on some hill-side, or in a field corner. It will do you no injury—you will never miss it; and the poor industrious man, your neighbour, will rejoice. You will delight in seeing his children learning to be industrious. Without industry and obedience there can be no happiness in families; and, of all other plans, I feel persuaded that this promises the best to promote health, cleanliness, and domestic comfort (applause).

J. ARMITAGE, one of the Almondbury gardeners, having been called upon, addressed the meeting, and we are only sorry that, owing to our confined space, we are not able to publish the whole of his striking speech. Among other pertinent remarks he said: In his opinion there really was no resource for the labouring poor of this neighbourhood, but to get their living, in part at least, out of the land. Employment in manufactures was now most irregular; and the introduction of cottage gardening into Almondbury had done good incalculable. Now the poor cottager can have his vegetables sweet and good, and in great abundance too. "Time lost is gone for ever," but now there is no reason why a remnant of it should be lost; and in pursuits like gardening there is perpetual pleasure. To watch the progress of vegetation was to the gardener one of the greatest delights on earth. A poor man so occupied, with the prospect of a reward for his labour before him, need not envy the greatest among mankind; neither must he forget their late "harvest home," graced by the presence of dignified persons, and of all ranks, when the rich did not deem it beneath them to sit down with the poor, to enjoy with them the humble fruits of the field garden, and to partake of that large plum-pudding presented to them by their kind benefactress Mrs. W. W. Battye (applause). He concluded by mentioning an interesting fact in natural history, and by inviting the Farnley brethren to the monthly discussion-meetings of the Almondbury Society, presided over by their kind friend John Dougill, Esq. (cheers).

Mr. JOHN GILL, a spade farmer, of Farnley Tyas, described

the rotation of his crops on his eight acre farm, cultivated on the four course shift, as follows:—Two acres in green crops, mangel wurzel, turnips, potatoes, and cabbages; two acres in red clover; four acres in corn; half an acre of tares following the last grain crop, as an extra one, followed the same year by turnips. By manuring the two acres under root crops, the whole farm becomes manured in four years. By stall-feeding the farm is made to support itself in manure, with the exception of lime and gypsum. In one year, from November, 1848, to November, 1849, manure has been manufactured that will supply one-third of the farm, exclusive of the liquid manure prepared for the clover; and this manure remains partly in store for the second crop. The red clover is sown with the first grain crop, and by sowing it over with gypsum, and by sprinkling the sward when cut, with tank liquid, it can be cut three times; and it is found that a good crop of clover so managed will stall-feed the most cattle on the least space of ground. (Applause.)

FREDERICK THYNNE, Esq., of Westminster, in an eloquent speech, after alluding to the dreadful scenes lately witnessed in London, said that the sad visitation of the cholera would, it was to be hoped, induce tenants to attend more to cleanliness in the farm-yard and premises. 'Filthiness is disease—and disease is death,' and sorry was he to have to say that in many cases there was much to complain of in this respect. Sanatory reports seemed to have little influence upon the inhabitants of the 'hill side'—let them not feel too secure, but without delay get rid of their filthy 'sour holes,' lest they should have sore hearts. A few years ago no allotment gardens were to be found in this district, and now it had been stated that there were 800; he thought there were more, for in Slaithwaite alone there were 200 roots of land under spade culture. But assuming the number to be 1000, and that each family occupied in their cultivation averaged five individuals, then 5000 individuals were now rejoicing, not depending for bread upon others, but trying and learning to be self-dependent. However much the plan of encouraging poor men to work on the land at intervals, when they had not work at the loom, might once be scoffed at, it could not be so now. No splendid promises had at any time been made—much more than was promised had been realized, and it now plainly appeared that without going out to California, some £5000 annually is being drawn out of the earth in the hills around Huddersfield, by unemployed unskilled labourers, which for want of due encouragement, had not been drawn out before. Mr. T. illustrated this in his own felicitous manner, showing that manual labour by the spade can be successfully practised by the most unskilful person, that time mispent, or in idleness, is money thrown away, like pence, shillings, sovereigns, recklessly chucked into a river. (He concluded an excellent address amidst loud cheers.)

PRIZE LIST.

The prizes were then delivered to the successful candidates with suitable, and in some cases, complimentary remarks; after which the scholars entitled to payment for their labours in the school garden were brought in, and each boy received the sum he was entitled to, according to the number of hours he had there been employed. Cheers were then given most heartily for the noble patron, also for his worthy agent, and after singing the national anthem, the meeting separated.

FARM PREMIUMS FOR FARNLEY AND OTHER TOWNSHIPS.
BY THE PLOUGH.

Mr. Jonathan Senior, for wheat, 34lbs. in ear, 60lbs. straw per rod.

„ John Kaye, for oats, 114lbs. corn and straw, per rod.

„ Jonathan Senior, tares, 13½ tons per acre.

„ John Kaye, turnips (Swedes) 28½ tons per acre.

- Mr. Jonas Kenyon, mangel wurzel, 19 tons per acre.
 „ Joseph Scott, Belgian carrots, 14½ tons per acre
 „ Joseph Scott, turnips after a green crop, 19¾ tons per acre.

BY THE SPADE.

- Mr. George Sykes, for wheat, 34½lbs. in the ear, 61lbs. straw per rod.
 „ Jonathan Senior, potatoes, 15¼ tons per acre.
 „ Jonathan Senior, turnips, 27½ tons per acre.
 „ James Sykes, mangel wurzel, 20¼ tons of bulbs, tops, 14 tons per acre.

ON COTTAGE ALLOTMENTS BY SPADE HUSBANDRY.

- Mr. Mark Mellor, for wheat, 38lbs. 7oz. in the ear, per rod.
 „ Mark Mellor, for turnips, 26¾ tons per acre.
 „ John Booth, turnips after potatoes this year, 25½ tons per acre.
 „ Mark Mellor, for mangel wurzel, 26½ tons per acre.
 „ Mark Mellor, for potatoes, 24½ tons per acre.
 „ William Brooke for carrots, 12¾ tons per acre.
 „ Mark Mellor, for white beet, 16¾ tons per acre.

JOHN NOWELL, Esq., in the course of the evening rose and said, that from the late labours of eminent foreign chemists, and of our own countryman, Professor Johnston, some discoveries had emanated well worth the attention of practical men; and “gleanings” from them he offered thus early to the notice of practical farmers, in the hope that suggestions apparently of the highest value should not be disregarded. The warnings of science should never be despised; at the same time due caution ought to be exercised in reducing its suggestions to practice. Scientific deductions are in general, however, almost always discovered to be sound; and if slow in adopting them, in time we find that we are impelled, almost unknown to ourselves, to undertake new modes of practice resulting from philosophical research. The following hints therefore relative to stall-feeding he now submitted to the intelligent husbandman as worthy of notice:—

TURNIPS.—A ton of Swede turnips in the bulb contain of the phosphates from 3lbs. to 6lbs. A ton of the tops of Swede turnips contain of the phosphates 10lbs. These phosphates are the earthy matter of which bones are principally constructed, entering also largely into the composition of milk. Hence the tops consumed by cows will give a larger supply of milk than the bulbs, and the milk will be more nourishing food for young stock, whose bones are forming (cheers.)

NUTRITIVE VALUE OF THE DIFFERENT CROPS.

CABBAGE.—The cabbage has lately been chemically examined, in consequence of the failure of the potato, with a view to its substitution for that root. It is found to be *richer in “muscle-forming matter” than any other crop we grow.* It contains more “fibrin” or “gluten,” of which substance the muscles are made, and hence is richer in the material essential to the health, growth, and strength of an animal; wheat contains about 12 per cent. of it; beans, 25 per cent.; but dried cabbage contains from 30 to 40 per cent. of this all-important material, of which the principal mass of the animal structure is built.

An acre of good land will produce 40 tons of cabbage. But—

1 acre of 20 tons of drum-head cabbage will yield 1500 of gluten.	lbs.
1 do. of 30 tons of swede turnips	1000 do.
1 do. of 25 bushels of beans	400 do.
1 do. of 25 bushels of wheat	200 do.
1 do. of 12 tons of potatoes	550 do.

Such is the variation in our general crops, as to the amount of

this “gluten,” *this special kind of nourishment, this “muscle-sustaining principle,”* which accounts for the preference given by experienced farmers to the cabbage as food for stock and milk cows, although the crop impoverishes their land, which requires much manure to restore it to its former fertility.

OATS.—The grain of the oat plant is found on analysis to be richer in this gluten, this “muscle-forming material,” than the grain of wheat, and oatmeal a better form of nourishment than flour. Hence the superior strength of the Caledonians.

BRAN is found to be richer than the interior part of the grain in “gluten,” in “muscle-forming material”—which proves that our antiquated country dames indulge not in mere conceit when they persist in preferring good wholesome wholemeal-bread to the white loaf.

BUTTER AND CURD OF MILK.—A voice from the laboratory tells us that the butter and curd of milk correspond to the fat and muscle of the animal, “hence the reason why good milkers are generally poor, and why the milk decreases when they begin to fatten.” Oily substances, given as food, in the animal economy become clarified into butter, or spread over the bones as fat. If we want butter, we must give linseed or linseed-cake. If we want to fatten, we must do the same, or give other fatty substances, rich in oil, with their ordinary food. But if curd or cheese is wanted, then we must give beans or cabbage, or other food rich in “gluten”—*that always-to-be-remembered muscle-forming material*—(applause).

BARLEY AND MALT.—Late experiments have settled the question as to the inferiority of malt to barley in feeding cattle. Barley in the process of malting loses about seven per cent. of highly nutritive substances, and thus is its nutritive power diminished. But in malt there is a peculiar substance found, generated in the malting process, and of high solvent power, which greatly aids the digestion of other food, even when such malt is given in small quantities. One-tenth part of the barley devoted to feeding stock may be used in the shape of malt. A small portion may be given, as a digestive, with dry food. A smaller portion still with moist food, like potatoes, may be given: the digestion will thus be improved, and the health of the animal ensured; while even in man the mastication of a little malt after meals would contribute to the digestive process.

SWINE.—The same remarks apply to the food of the hog. If we wish to promote proper development of the muscular parts, and of the bone, we must give food rich in the “muscle-forming material,” and not deficient in the “phosphates”—cabbage, swedes with their leaves; and afterwards feed the animal with substances containing much charcoal, so that fat in moderation may be spontaneously formed: such articles are beans, oatmeal, barley, grains, &c. If we wish to transfer fatty matter already formed—to make the animal into a “kind of oil butt”—we must give, with other food, greasy substances—“tallow-crap,” linseed-meal, anything in short which contains the unclean fat we wish to be clarified and manufactured, by this most useful creature, into good wholesome lard (cheers.)

PASTURE LAND.—Every milk cow robs the land annually of as much phosphate of lime (bone-forming material) as is contained in 80lbs. of bone-dust. From this cause the Cheshire pastures became greatly deteriorated, but were restored to their former fertility by being well boned. Land continually depastured must be fed regularly with phosphates—by the application of bones, nightsoil, &c. Some descriptions of lime contain phosphates in sufficient quantity, but not all. When the mountain limestone of Derbyshire, formed almost entirely of a congeries of fossil shells, and hence rich in phosphates, becomes accessible by railway, it will probably be found of great value to pastured land (applause).

DRAINAGE AND IMPROVEMENT OF LAND—APPLICATIONS FOR ADVANCES.

In the year 1846 an act was passed by which the Treasury were empowered to make advances from the Consolidated Fund, to the amount of £2,000,000, for the improvement of land in Great Britain, by works of drainage. The Inclosure Commissioners were appointed to execute its provisions, and the whole of the money was soon advanced. Last session a similar measure was carried. The Treasury were again empowered to advance £2,000,000 for the execution of drainage, the improvement of land, and the erection of farm buildings; and this measure is also to be carried out by the Inclosure Commissioners.

In committee upon the bill last session, a question was put by Mr. F. Mackenzie, as to the proportion of advances to which Scotland would be entitled under its provisions. The honourable gentleman, whilst asking the question, expressed a hope that the grants under the new measure would be made upon the same unfettered principle that characterised those under the previous act. The Chancellor of the Exchequer replied "that justice would be done to the enterprise of the Scotch proprietors, but at the same time there was a great object to be attained. It was very desirable to extend the drainage of land throughout the country, and over as wide a surface as possible. Of the last £2,000,000 the Scotch proprietors had rather more than £1,600,000. The money was all appropriated on the principle simply of priority of application. The sum allotted to England was £373,000, and the six northern counties got £191,000, the whole of the rest of England and Wales having only £182,000. He thought that reward should be given to superior energy and sharpness; but then the great object of obtaining the benefit of drainage throughout the length and breadth of the land was not attained. Without any invidious distinction, he thought it desirable to extend the benefit of this loan to every portion of the kingdom. He proposed that applications should be sent in to a given day; he would apportion the money to different counties, and then he would give the preference to priority of application in each of those counties; and then if any was left, it would be advanced to parties either in Scotland or elsewhere who made application." Such being the principle upon which the new act was to be administered, we have copied the list of applications, from which it will be seen that, so far, it has been very fairly carried out. Before proceeding to detail the applications, it may be expedient to state the two main conditions under which grants are made. They are, first, a certificate from a Government officer that the contemplated improvements will yield, or are likely to yield, a return of $6\frac{1}{2}$ per cent., and the repayment of the advances by instalments of £6 10s. per cent. for twenty-two years. The advantages to the borrowers, therefore, are, the impossibility of foreclosing, no investigation of title, unless the application is opposed, and payments in

proportion to life interests. The following, then, are the applications up to the present period. For the sake of typographical convenience, the names of localities have been in most cases abridged:—

BEDFORD.

Mr. R. L. Orlebar, Poddington and Hinwick	£500
Lord Ongley, lands in Eyworth	2500
Rev. John Sloper, West Woodhay	500
Total.....	£3500

BERKS.

A. Cobham, Esq., Shinfield	800
Honoria Blane, widow, Winkfield Park	400
Total.....	£1200

BUCKINGHAM.

Sir H. Verney, Middle Claydon	2000
Mr. Grenville, Doddershall	300
Sir T. D. Aubrey, East Claydon and Steeple Claydon	5000
Jane Cook, lands in Steeple Claydon	1500
Total.....	£8800

CAMBRIDGE.

John Bridge, farmer, Nosterfieldend Farm.....	£407
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CHESTER.

Lord Alvanley, lands in Frodsham, Eddisbury, Weaverham, Tarvis, and Tarporley	4000
R. Wilbraham, Esq., lands in Bruen, Stapleford, Huxley, Foulk-Stapleford, and Odd Rode.....	1000
Sir A. I. Ashton, lands in Dutton	5000
The Guardians of A. H. Davenport, Esq., lands in Prestbury, Bunbury, and Acton	4000
J. R. Shawe, Esq., lands in Woodchurch and West Kirby	4400
Total.....	£18400

CORNWALL.

The Rev. E. C. P. Phillpotts, Lezant Glebe	300
The Rev. H. M. Rice, South-hill Glebe	140
Total.....	£440

CUMBERLAND.

J. Robinson, Esq., part of Whitbarrow-hall, Grey-stoke	1000
The Rev. W. Sharp, Addington	500
R. E. W. Standish, Esq., lands in Arthuret, &c.	3000
The Rev. J. Heysham, lands in Castle Sower and Lazonby	350
H. Howard, lands in Greystoke, Dacre, and Newton...	4000
The Rev. J. Bird, lands in Ainstable	300
The Rev. G. Bell, Midburnhead	100
R. Leach, Esq., Edenbanks	100
J. Jollie, Askrigg-hall	450
The Bishop of Carlisle, Lanrigg Bank, Lonescheugh	1500
W. Armstrong, Esq., Borderrigg and Lowgrains	500
Lady Vane, lands in Bassenthwaite, &c.	3700
The Rev. J. Wannop, lands in Kirkandrews-on-Esk and Crosby-on-Eden	100
G. Dixon, Esq., Whinney Hill	70
Trustees under the will of Henry Fawcett, Esq., of Bombay, lands in Stapleton	500
Captain Walker, Gilgarron	200
The Rev. J. S. Mulcaster and William Bell, Esq., lands in Irthington	200
Total.....	£16070

DERBY.

C. R. Colville, Esq., M.P., lands in Lullington, of Belper and Heaze.....	2500
A. M. Mundy, Esq., M.P., Shipley and Mapperley ..	1000
The Duke of Newcastle, lands in Whitwell	350
Total.....	£3850

DEVON.

Sir E. S. Pridaux, lands in Farway, Northleigh, Southleigh, and Offwell	500
Sir Lawrence Palk, lands in Hennock, &c.	3000
C. H. Webber, Esq., lands in Braunton.....	1200
S. Wreford, Esq., lands in Spreyton, &c.	1200
H. Champernowne, Esq., lands in Dartington and Rattery	1900
Rev. H. Edwards, jun., Rectorial Glebe, Churchstanton	122
John Ley, Durply.....	400
W. W. Yonge, Esq., Thelbridge, Barton.....	450
E. Vidal, Esq., lands in Abbotsham	450
Total.....	£9222

DORSET.

W. T. Cox, Esq., Little Windsor, Chedington, Stocks	2409
Lord Henley, Chardstock Manor	2000
Sarah Moore Halsey, Fulham.....	5000
Rev. R. Huyshe, Chedington Glebe lands	108
Lord Abinger, Halstock	450
Lieutenant-Colonel Malet, Fontmell Parva	1200
Total.....	£11167

DURHAM.

J. Eden, Esq., lands in Chester-le-Street, &c.	4000
The Countess of Strathmore, Dunhouse, Broomiland	2110
G. Salvin, Esq., Butterwick	1681
W. R. Robinson, Esq., Silksworth.....	3000
The Governor, &c., of the Foundations of Sir William Turner, Brereton.....	600
The Earl of Durham, lands in Chester-le-street, Pen-sher	5000
The Rev. H. J. Maltby, Glebe.....	500
T. Meynell, Esq., Eaglescliffe.....	810
George Palmer, jun., and Mrs. Meredith, Harold's Park, Essex	2000
George Palmer, jun., Esq., lands in Waltham Abbey, Nazeing	1000
The Rev. Lord Charles Hervey, Little Chesterford Rectory	950
The Earl of Essex, lands in Stebbing, Rayne, and Great Saling.....	2000
Total.....	£23651

GLOUCESTER.

The Rev. W. Wiggins, Oddington Rectory, Oddington	220
J. C. Hayward, Esq., Quedgeley, Quedgeley and Hard-wick	1000
H. Howard, Esq., lands in Thornbury	1000
T. G. B. Estcourt, Estcourt, Shipton Moigne	1800
A. G. Fullerton, Esq., lands in Almondsbury, Alveston	1240
The Rev. S. G. Bourke, Hatherop Glebe.....	1000
The Rev. C. G. Davies, Tewkesbury Glebe.....	1650
Total.....	£7710

HEREFORD.

Sir T. E. Winnington, lands in Upper Sapay.....	400
The Right Hon. Lord Bateman, lands in Shobdon and Aymestrey	3446
Augusta Biddulph, widow, and R. Biddulph, Esq., lands in Ledbury and Donnington	1500
F. B. S. Penryre, Esq., lands in Clifford.....	3000
Total.....	£8346

HERTS.

The Earl of Essex, lands in Little Hadham, Bishop's Stortford, and Albury	3000
T. G. Estcourt, Esq., Oxtrey	500
The Rev. W. W. Harvey, Glebe land in Buckland...	200

Sarah Hall, widow, lands in Northaw.....	280
Sir E. G. E. L. B. Lytton, lands in Nebworth, Ste-venage, Lichworth, Hitchin, Welwyn, and Sheephall	3000
Earl Cowper, lands in Hertingfordbury, &c.....	1500
Total.....	£3480

HUNTINGDON.

J. H. S. Barry, Esq., Hamerton	5000
The Duke of Manchester, lands in Alconbury, &c. ..	4910
Total.....	£9910

KENT.

T. Waller, Esq., Stodmarsh.....	1000
The Rev. N. Toke, Godington Toke	5000
T. Papillon, Esq., lands in Acrise, &c.	3000
J. Cator, Esq., Beckenham.....	2500
Total.....	£11500

LANCASTER.

The Earl of Sefton, Tarbock	5000
Sir T. P. Kay Shuttleworth and Lady Kay Shuttle-worth, Shuttleworth.....	5000
J. I. Blackburn, Esq., lands in Childwall, Warrington, and Winwick	5000
Lord De Tabley, lands in Blackburn	5000
Charles Towneley, Esq., Towneley.....	5000
Sir Thomas G. Hesketh, lands in Rufford, &c.....	5000
W. L. Clowes, Esq., lands in Manchester and Eccles..	4800
The Rev. R. Atkinson, lands in Cockerham	1000
Total.....	£35800

LEICESTER.

The Rev. F. J. Norman, lands in Bottersford	700
Lady Noel Byron, lands in Wellsborough, &c.....	2416
R. A. Slaney, Esq., M.P., Netherseal.....	500
Sir H. S. Wilmot, Bart., Shawell	1750
Total.....	£5366

LINCOLN.

Sir H. Dymoke, Bart., Scivelsey	150
The Rev. W. H. Flowers, Uleby Vicarage.....	36
The Executors of G. Broadrick, Esq., deceased, lands in Wroot	226
Total.....	£402

MIDDLESEX.

T. G. B. Estcourt, Hedgestone	400
G. Wood, Esq., Hanger-hill, Prior's-place.....	1500
The Rev. J. Saunders, Rector of St. Luke's, Old-street, Willoughby Farm	500
Total.....	£2400

MONMOUTH.

Sir G. Morgan, Bart., Tredegar	4000
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NORTHUMBERLAND.

P. Selby, Esq., Shotton	1000
The Mayor, Aldermen, and Burgesses, of Morpeth, Morpeth-common	400
Earl Grey, lands in Warkworth and Carham.....	5000
T. H. Graham, Esq., Black Callerton, Prodclaw, and Low Mill	3000
T. Anderson, Esq., lands in Kirk Harle, and Kirk-hewlington	5000
A. Atkinson, Esq., High Trehwitt.....	1500
A. J. Cresswell, Esq., and E. M. B. Cresswell, his wife, Ellington and Hug-house	4000
The Rev. J. D. Clark, Belford, Easington	5000
T. W. Craster, Esq., Craster, Beadnell	2000
Guardians for George Darling, Esq., West Horton, East Horton.....	1200
Col. Sir W. Davison, Swarland	2000
J. Pullett, Esq., Linton	3000
S. E. Widdington, Esq., Newton and Hawley.....	2000
Sir E. Haggerston, Bart., lands in Ellingham, Lowick, and Carham.....	5000

Sir W. C. Trevelyan, Bart., lands in Hartburn, Thockington, and Kirkwelpington	5000
Mary Cook Bell, Bellasis and Boghall, Stannington; and Mrs. Jane Fenwick, Higham Dike, Ponseland. .	700
J. M. Fenwick, Esq., lands in Long Framlington ..	1000
R. Hawdon, Esq., High Espney	400
Mrs. Ann Hawdon, lands in Whalton	200

Total..... £47400

NORTHAMPTON.

Lord Bateman, lands in Arthingworth and Kelmarsh	908
Colonel Hutchinson, Sulgrave	200
The Duke of Cleveland, Brigstock-fields	500
The Rev. Amos Westoby, Rectory Farm, Farthington	200
The Rev. J. T. Fleisher, Rectory Farm of Tiffield ..	300
The Rev. Thos. Scott, Wappenham Rectory Farm ..	260

Total..... £2308

NOTTINGHAM.

John Vere Esq., Carlton	2500
Viscount Melbourne, Greasley, Selston	5000
The Rev. C. J. Myers, lands in Flintham	600
The Rev. Thomas Shepherd, High Field Farm, Glebe, Clayworth	800
Trustees of Samuel Ellis Bristowe, Beesthorpe. . .	5000
The Rev. H. R. Harrison, Glebe, Elston	400
R. Holden, Esq., Hawton, Nuthall	4000
The Rev. T. T. Penrose, Weston Glebe, Weston ..	500
The Duke of Newcastle, lands in Workop and Egmonton	1206
The Executors of G. Broadrick, Esq., lands in Finningly	792

Total..... £20798

NORFOLK.

J. Cator, Esq., Woodbastwick	2500
H. S. Partridge, Esq., Great and Little Hockham. .	2000
Sir H. Bedingfield, Bart., Oxburgh	1000
H. Le Strange, Esq., lands in Snettisham, &c.	3800

Total..... £9300

OXFORD.

Earl Amherst and Mary Countess Amherst, lands in Bruern Tangley	1350
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SALOP.

R. A. Slaney, Esq., M.P., lands in Preston Gubbals and Baschurch	1500
G. Wood, Esq., Culmington	1000
James Parry, Esq., Yeaton	400
William Plowden, Esq., Plowden Hall, Styche	4000
The Earl of Powis, Owbury	5000
C. O. C. Pemberton, Esq., Roden Millichope. . .	2000
Lord Berwick, lands in Atcham, Berrington, Wroxter, and St. Chad. . .	2500
Lady Tyrwhitt, lands in Cardington, &c.	4000
Mrs. C. H. Cludde, Orleton	1500
R. Gardner, Esq., lands in Leighton, Alderbury, and Clive	1800
R. B. More, Esq., Linley	1500
Sir E. J. Smyth, Bart., lands in Acton Burnell, &c. .	4090
J. A. Lloyd, Esq., lands in St. Mary, Shrewsbury, Fitz Baschurch, &c.	5000
T. C. Whitmore, Esq., M.P., lands in Stockton, Worfield, Chelmarch, and Chetton	1500
E. W. S. Owen, Esq., lands in Conover, Westbury, &c.	5000

Total..... £40790

SOMERSET.

Committee of the Estates of E. W. L. Popham, a lunatic, lands in Marksbury	5000
Charles Stewart Clarke, lands in Wanstrow	562
The Rev. J. S. H. Horner, Mells Park	5000
Lord De Mauley, Pawlett	5000
Lieutenant W. Gardiner, Stancombe	300
The Rev. R. W. Lambert, glebe lands of Swell	85
E. J. Charter, Esq., Wick and Broome, ...	350

R. C. Tudway, Esq., lands in St. Cuthbert, Wells, and Wookey	2000
The Rev. Charles Tripp, D.D., lands in St. Decumans and Kingsbrompton	160

Total..... £18457

SOUTHAMPTON.

Lord Bolton, lands in Kingsclere, Basing, and Sherborne St. John	880
The Duke of Buccleuch and Queensbury, K.G., lands in Beaulieu	5000
William L. Wiggett Chute, Esq., lands in Sherborne St. John, Basing, and Sherfield	2572
C. W. Martin, Esq., lands in Arretton and Whippingham	600

Total..... £9052

STAFFORD.

Earl Ferrers, Chartley	5000
C. Coyney, lands in Caverswall	1500

Total..... £6500

SURREY.

Lord Abinger, lands in Abinger, Ockley, and Windlesham	200
A. Donovan, Esq., lands in Lugfield and Crowhurst. .	1000
The Hon. Mary Howard, lands in Ashstead	2000
Colonel Wood, lands in Cranley	1000

Total..... £4200

SUSSEX.

Lord Abinger, lands in Chailey St. John's	350
Earl Amherst and Mary Countess Amherst, lands in Bexhill, Arlington, Lullington, Chiddingly, Innerhorne	1650
F. Weekes, Esq., lands in Slaugham and Bolney ..	1000
John V. Shelley, Esq., Maresfield Park	2500
The Earl of Chichester, lands in Hellingly, Chiddingly, Easthothly, and Laughton	4000
The Bishop of Oxford, Wollavington, and Graffham ..	1600

Total..... £11100

WARWICK.

Sir E. J. Smythe, Bart., Wootton Wawen	910
Lord John Scott, lands in Dunchurch, Church Lawford, and King's Newnham	5000
The Earl of Denbigh, lands in Monk's Kirby	2600
The Rev. J. S. Hodgson, lands in Brinklow	390

Total..... £8900

WILTS.

T. G. B. Estcourt, Esq., lands in Long Newton and Ashley	2300
The Earl of Pembroke, lands in Stanton, Dinton, Fovant, &c.	5000
R. H. Pollen, Esq., Rodbourne	1000
The Marquis of Ailesbury, lands in Berbage, Little Bedwyn, Great Bedwyn, and Easton	2500
The Rev. C. Randolph, lands in Somerford Keynes. .	3000
R. Kinnear, M.D., lands in Leigh and Ashton Keynes	550

Total..... £14350

WORCESTER.

Sir T. E. Winnington, Bart., lands in Clifton-on-Teame, Stanford, &c.	2100
The Hon. Robert Clive and Lady Harriet Clive, Hewell	5000
W. J. Acton, Esq., lands in Stoulton and Holycross, Pershore	400

Total..... £7500

YORK.

The Executors of G. Broadrick, Esq., deceased, lands in Hatfield, Hampall, and South Kirby	2732
H. Peckell, Esq., lands in Hushwaite	900
The Rev. W. Potchett, lands in Patrington and Holmpton	1050
Col. J. Peel, Knowlmere	5000

W. B. Beaumont, Esq., lands in Sandale, Silkstone, &c.	5000	Lord Vivian, Plasgwyn	1172
Lord Bolton, lands in Thoruton Steward and Downholme	1000	J. L. H. Lewis, Esq., lands in Llanfair, &c.	1700
T. B. Bosvile, Esq., Ravenfield and Conisbrough	450	Total	£2872
The Marquis of Ailesbury, lands in East Witton, Fingall, and Wath	2500	BRECON.	
The Earl of Harewood, lands in Harewood, &c.	5000	Sir Charles Morgan, Bart., Therrow	1000
Lord Hotham, lands in Beswick and Lockington	5000	Col. Wood, lands in Aberlunvey, Glasbury, &c.	1300
John T. D'Arcy Hutton, Esq., Aldburgh	2000	The Rev. T. Williams, Forchollwyn, and Tir-y-cwm	1000
The Rev. J. C. Atkinson, Danby Glebe	33	Total	£3300
W. Allison, Brettanby, Esq.	1500	CARDIGAN.	
Lord Alvanley, Pepper Hall	1000	The Rev. R. W. Miles, Priory, Cardigan	1000
The Rev. T. W. Mercer, lands in Northallerton	300	CARMARTHEN.	
J. C. Maynard, Esq., Harlsey	2400	The Hon. W. H. Yelverton, Whitland Abbey	1500
P. Middleton, Esq., Middleton-lodge	2000	DENBIGH.	
Sir G. Wombwell, Bart., Newburgh	5000	T. M. Biddulph, Esq., Holt	400
The Hon. C. H. B. C. S. Wandesford, lands in Kirklington Wath, Catterick	5000	Robert M. Biddulph, Esq., Chirk Castle	5000
J. T. Wharton, Esq., lands in Gilling Skelton	5000	J. L. Wynne, Esq., lands in Llanellan, Llanddulas, &c.	1273
M. Wyvill, Esq., lands in Fingall	5000	The Rev. C. W. Maude, Holt	400
J. S. Wyndham, Esq., Waghen	5000	Total	£7073
W. Walker, Greenbury-grange	250	MONTGOMERY.	
The Rev. J. Watson, Holmpton Glebe	33	G. H. Whalley, Esq., Clochfaen	1000
G. E. W. Jackson, Esq., lands in Ormesby	1000	The Right Hon. C. W. W. Wynn, M.P., lands in Meifod and Llangyniew	3675
H. W. Yeoman, of Richmond, in the county of York, Esq., lands in Egton, Lythe, Aislaby, and Whitby	2500	C. O. C. Pemberton, Esq., lands in Llandisilio and Llandrinio	1000
J. L. H. Lewis, lands in Spennithorne	300	The Rev. C. Tripp, D.D., lands in Llanbrynmair	420
The Duke of Leeds, Hornby	5000	Total	£6095
H. A. Littledale, Esq., as trustee of the poor of the parish of Bolton-by-Bowland, lands in Bolton-by-Bowland	184	PEMBROKE.	
Ditto, trustee for Bolton School, lands in Bolton-by-Bowland	368	The Rev. C. H. Barham, lands in Fishguard, Little Newcastle, &c.	£4500
The Bishop of Ripon, lands in Ripon	150	The following is a summary of the advances in the several counties :—	
Lord Rokeby, lands in Burneston, Pick Hill, and Gilling	5000	Bedford	£3,500
W. S. Raine, Esq., lands in Hutton Rudyby	800	Nottingham	£20,798
The Rev. W. Raine, lands in Sockburn	1000	Berks	1,200
The Rev. C. J. Simpson, land in Kirkby Misperton	250	Norfolk	9,300
The Rev. J. Swire, lands in Kirby Malzeard, Hampsthwaite, &c.	4000	Buckingham	8,000
H. Van Straubenzee, Esq., lands in Spennithorne	500	Oxford	1,350
Sir Charles Dodsworth, Bart., lands in Wattass, Be-dale, &c.	2000	Salop	40,790
H. B. Darley, Esq., lands in Bossall, Scrayingham, and Skirpenbeck	4000	Chester	18,400
The Rev. Edward Dean, Barby Glebe	80	Somerset	18,457
C. Dryden, Esq., lands in Wilton and Ormesby	600	Cornwall	440
A. L. Maynard, Esq., lands in Brotton, Lofthouse, and Skelton	700	Southampton	9,052
The Marquis of Normanby, Mulgrave Seaton	5000	Cumberland	16,070
Thomas Cheeseman, Brier Hills, Hatfield	150	Stafford	6,500
The Rev. T. H. Croft, Duggleby	150	Derby	3,850
The Rev. W. Craven, Glebe Farm, Aldburgh	120	Surrey	4,200
Colonel Harrycroft, Stillington, Marton, &c.	1000	Devon	9,222
Archdeacon Creyke, glebe farms, Beeford	300	Dorset	11,167
John C. Chaytor, Esq., lands in Cowton	800	Warwick	8,900
The Rev. Samuel G. Crompton, lands in Carlton	250	Durham	23,651
The Governor and Sisters of Turner's Hospital, lands in Stainton	880	Gloucester	7,710
George Thompson, Esq., Drax and Barlow	4500	Hereford	8,346
The Earl of Eflingham, Grange	5000	Herts	8,480
Catherine Gale, lands in Hauxwell	200	Huntingdon	9,910
The Rev. John Gwyther, lands in Fewston and Hampsthwaite	4000	Cardigan	1,000
The Hon. P. S. Foulis, lands in Ingoldby, Greenhow	1500	Carmarthen	1,500
Total	£114860	Denbigh	7,073
		Montgomery	6,095
		Pembroke	4,500
		Total	£533,026

So that little more than one-fourth of the whole sum has yet been applied for. The advances are limited to £5000 in all cases; but, as will be observed, the majority of the applications are for amounts much below the maximum.

CALENDAR OF HORTICULTURE.—OCTOBER.

RETROSPECT.

The weather since the 27th August has been perfectly fine, though more cloudy at times than the very high condition of the barometer would indicate. An elevation of the mercury—the average with me being above 30 in. 20 cts. during 20 days—ought, according to theory, to represent a high pressure, sufficient to buoy up atmospheric vapours; but there are other agencies at work, pre-eminent among which is electricity. Our table will disclose the state of the winds, and thus point out the observed causes which may have assisted to influence the extraordinarily low average of the temperature. The ground at the middle of the month was parched, and this state has perhaps tended to *secure* if not to *restore* the potato crop. The produce is beautiful; the tubers mealy, and far superior in quality than any we could procure since 1845. The haulm yellows off as it should and was wont to do, even in plots where the black discoloration had commenced. In a word, let alarmists—your “wolf”-criers—assert what they may, the existing prospect is most favourable. *Wall-fruit* to the 16th was backward, being retarded by cold. *Plums* abundant. Frosts, in low situations, certainly blackened *dahlias*, *marvel of Peru*, and the like, about the 5th and 7th of the month.

Manure claims more particular attention than ever, in consequence of the new discoveries lately announced and detailed in the recently published “Journal of the Royal Agricultural Society.” I cannot now permit the subject to pass unnoticed, and especially because experiments have proved (little appreciated at the time) that the earth, according to its composition, absorbs and retains manure in a manner hitherto little suspected, though now fully revealed by the numerous analyses and researches described in the elaborate article of Professor Way. While that learned and patient chemist proceeds in his refined processes, every gardener may convince himself that a loamy soil, sifted through a common ash sieve, and pressed evenly into a hyacinth pot 6 to 8 inches deep, will deodorize and clarify the foulest fætid manure water, if gradually poured on the surface of the mould in small quantities, allowing each to be absorbed, and sink down into the earth before another quantity is added. After a certain time, when the earth is saturated, some fluid will pass through the hole at the bottom of the pot, which

is to be received by a garden saucer. It may bring some earth with it at first, that can be returned over the surface or not; but when it passes clear, more of the liquid manure is to be added, till an ounce or two shall be collected in the pan. This “filtrate” will generally be found deprived of colour and offensive smell or taste. Such experimental trials may be extensively varied with solution of guano, dunghill drainage, &c. &c.; and, provided the liquid contain any salts of ammonia, and the soil be loamy (in which carbonate or other salts of lime are combined), the ammonia *will be absorbed* and *fixed* by the earth; while the water which has drained through it will be found to contain a portion of lime, traceable by that delicate re-agent, oxalate of lime. The consequences resulting from these recent discoveries cannot, as yet, be sufficiently appreciated.

VEGETABLE DEPARTMENT.

Seed-sowing becomes restricted to salads, that is, *mustard* and *cress*, very early in the month; *radish* the same, both in the warmest spots or under glass. Salads may also be raised throughout winter in boxes, or even upon moist flannel, provided the place be always warm. *Lettuce-seed* ought to be sown only in frames. *Beans*—the mazagan or long-pod, in a 3 or 4 feet bed of good earth, an inch or so asunder, where a mat or two can be placed over the plants in severe weather—choose the last week, as also for *dwarf hardy peas*, a row or two as a trial. But little time is thus gained.

Transplant into frames the last sown lettuce-plants. In the fourth week put some of the best remaining *cauliflowers* into a warm rich border, to be covered with glasses, which, however, must be taken off or tilted, according to the open and mild state of the weather. *Cabbage-plants* always demand open ground, in no way shaded by trees; a bed of these from the seed-bed of August can be planted, nine inches apart, some as nurslings, others to be used in thinning order. New loamy soil should be chosen or incorporated with the old.

Mint is frequently required in winter or early spring. It may be obtained, either by means of a gentle hot-bed of leaves, or leafy compost, with 5 or 6 inches of fine earth upon it, in which the roots are spread in drills, and covered an inch deep, or by treating them in the same way in some convenient peach-pit, &c., where the glasses are put on before frost set in.

Continue to blanch *endive*. Collect the leaves when quite free from dew or damp; tie them neatly toward the tips; bring dry earth in a sloping hill around the stalk, and cover the whole plant and mould with a large pot, which should be lifted now and then to obviate the lodgment of moisture, as *endive* is apt to become mouldy.

Winter spinach must be kept clean by the use of the hoe; and, as the plants should ultimately stand three inches apart during winter, it will be best to draw up, in thinning order, such as become fit for use. Hoe between the last planted *broccoli*, and other plants of the cabbage family; thus bring every department into neat order. Hasten to dig and dry all the potatoes. People err much in leaving the tubers in the soil till they become clodded with dirt. So soon as any haulm turns rather yellow, the roots are ready, and ought, when dry, to be stored, though not in damp ground. If we are to secure the tubers against decay, thatched, dry, yet cold potato-houses, where neither frost nor rain can enter, with charcoal dust as a protecting medium, offer the most effectual means to do so. Trench the ground two spits, as the digging of *potatoes*, *parsnips*, *carrots* and *beets* advances, and set it up in rough ridges for the winter. Thus treat all open plots wherever the ground is strong.

FRUIT DEPARTMENT.

Gather and store *winter pears* and *apples* as they become ready; to know when they are so, gently lift upward, or turn each fruit; and if it do not detach itself, leave it a little longer. Large stores of apples, either for family use or for cider, are handled too roughly, or rather torn off; thousands are thus bruised so that mouldiness and decay is produced by the action of the air. Keeping pears absolutely require care individually, otherwise the *Beurrés*, *Charmontels*, &c., will suffer to a most wasteful extent. Now prune back to a fruit-spur all the shoots of *espalier* and *wall trees* which had been foreshortened or partially snapped, and bring the trees into neat compact order.

Leave the stone-fruit trees untouched, as to pruning, till February; but be sure to secure the bearing shoots in a regular, open order, to benefit by sun and air; lightly sweep off, with a soft brush, the looser leaves, and place them about the bole over the ground where the roots extend; then cover with short mulch.

Clean with the hoe, and dress the strawberry beds and rows; half decayed tan appears to be a safe and useful dress; cut off no leaves prior to winter; runner-plants had better remain where they are till new plantations be made, in March.

Do not prune *currants* and *gooseberries*, but take selected cuttings of straight last-summer's

wood, shortened to about a foot long. Cut off every bud from the lower two-thirds, reserving three or four eyes at the top; then set each half its length in the soil, and make it firm; if in a nursery-bed, the rows and cuttings may be ten inches asunder.

Raspberry bushes, we presume, have long been relieved from the old wood of last year. Six good new canes may be retained, and simply made compact by passing a soft ligature round their upper ends. The wandering suckers ought then to be removed by the fork, and the surface, 12 inches round the canes, mulched with short litter.

FORCING DEPARTMENTS.

Pineapples.—Two modes of fruiting suggest themselves at this season: 1st. In some large gardens the practice is doubtless retained, of stocking a hot-house with the largest plants, for the express purpose of maintaining a constant supply of fruit throughout the spring months. At the beginning of October the tan-bed is forked up; the tan screened, if much reduced by previous fermentation, and the loss made up by fresh tan. But here the caution not to create a bottom-heat of more than 75 degs. ought to be kept in view; a large bulk, that will retain its gentle heat, is of far the most consequence, since, be it recollected, that the process now commenced, *on this old system*, is one of "drying off" as a *check*, and not one of excitation, each plant being full grown, stout, and "stocky," quite capable to develop and bring to gradual and perfect maturity a large-sized pineapple. The atmospheric heat is, from the day of introduction, supplied by the sun only; the mould of the large pots (plunged to their rims in the temperate bed) is just moist throughout, and that moisture is merely supported by that of the tan, and by the *dewings* of a fine syringe that are given perhaps four times a week, an hour before sun-set, during the finest weather only, when the sashes are to be entirely closed. Thus the checking process gradually proceeds, the soil becoming more and more dry as the temperature by night is correspondingly reduced; and, at or about Christmas, *frost only* having been excluded, the check is deemed complete, and the plants are to be suddenly aroused from their state of constrained torpor. The tan-bed is now regulated; the inert matter removed by the screen, and more than replaced by fresh bark, which is thoroughly blended with the older bark of the bed. Again the plants are deeply plunged; the bed is supposed to rise to 80 or 85 degs.; the fires are lighted, and the night atmospheric heat thereby never suffered to decline below 62 to 65 degs. Water is given gradually, taking care that it do not run away by

the sides, but penetrate the heart of the soil to saturation. The solar heat by day is somewhat moderated by a judicious admission of air, yet it is permitted to range between 85 and 100 degs. A gardener, zealous in this system of simultaneous fruiting, may not (as I know) hesitate to assume that, out of 100 large plants, scarcely two shall fail to show fruit in succession, and ripen within the months of May and August, inclusive. 2nd. In gardens where the more natural "Meudon" and its corresponding process—improved at Trentham and elsewhere—are pursued, the large plants grown in soil *without* pots are never starved and checked. *Numbers* supply the demand, and fruit is borne at any season, according to the variety and con-

stitutional power of the plant. Suckers, off-sets, thriving successional, and fruiting pines are driven on at comparatively railway speed; always, however, with that discerning judgment which experience and practical skill have conferred.

CLOSING REMARKS.

The weather promises to change; and on this day a southerly wind has brought over a few rain clouds, with much softer temperature. We hear no complaints of any moment. The potato continues remarkably fine, but the drought and cold nights have curtailed the supply of French beans and runners.

Croydon, Sept. 20.

J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR SEPTEMBER.

During the whole of this month the weather has proved exceedingly fine for all agricultural labours. From the 1st until the 23rd inst. harvest operations progressed with great rapidity, and most of the corn was secured in excellent condition. Respecting the produce of the present year's wheat crop, numerous opinions, differing to some extent, have been offered; and from these we have arrived at certain conclusions, which, though at variance with those formed by some contemporaries, will, we conceive, be found correct. It appears to have become the "fashion" of late years, amongst some parties, to underrate to a considerable extent the productive capabilities of the soil. Such has been the case this year, as we have estimates before us of the produce of the wheat crop for the present season being 5,000,000 quarters *under* an average. In some districts the yield is, unquestionably, deficient, especially in the midland and some of the eastern counties; but that deficiency has, in our judgment, been partially made good by an increased growth in other quarters; nevertheless, it is evident to all connected with agricultural affairs that the total quantity of wheat produced in this country is much less than was grown in 1849; but we reserve to ourselves the opinion that the return is very little short, *in quantity*, of that of 1848. There is, however, another very important point to be noticed; viz., the numerous partially-formed ears to be met with in most localities. This must, of course, reduce the value of the samples to some extent, and compel the millers to use a large admixture of superior qualities—possibly foreign—to produce good flour: hence we infer that really

fine wheat will maintain their value; unless, indeed, we are overwhelmed with arrivals from abroad.

The quantity of barley grown this year cannot be considered large; yet, as it has been mostly got in without much damage from moisture, there is not likely to be any scarcity of malting parcels. Very few oats have, as yet, been thrashed out; but the growth is certainly not a large one. That of beans and peas is by no means good. From the most extensive inquiries, we are enabled to state that the stocks of wheat on hand of last year's growth is still rather large in some quarters. The great consumption will, doubtless, speedily clear the stack-yards. Scarcely any old spring corn remains, even in the principal districts.

Considering the present low prices of fat stock, the large fairs held during the month have ruled high, notwithstanding that the supplies offering have been large. One circumstance in favour of the sellers is the great abundance of keep, and, further, the depressed state of the oil-cake market.

On the whole, there has been a steady, but not to say brisk demand for fine wheats, both English and foreign. Prices have slightly improved since we last wrote; but the harvest on the continent, as well as in the United States, being larger, it is scarcely possible—looking to the immense number of orders forwarded for both wheat and flour—that any rise, calculated materially to benefit the home-producer, can be supported for any period. Barley, oats, beans, and peas, from the reduced stocks held by the dealers, have advanced to some extent, although the demand is evidently slackening.

The fine rains which fell towards the close of the month are calculated to have a most beneficial effect upon the turnip crop, our accounts respecting

which are, up to the present time, satisfactory. The state of the potatoes has occupied no little attention, both from the growers and consumers. The absence of much moisture during the first three weeks of this month doubtless materially assisted in checking the disease; and we may state, without hesitation, that a very large portion of the crop has escaped altogether. Up to the present time the metropolitan markets have been extensively supplied, and prices have ruled unusually low.

The produce of winter fruit is far from extensive. The greater portion of the new growth of hops has been already picked. Evidently, the produce is considerably in excess of many previous years, as there are free backers of the duty at £215,000 to £220,000. New Weald of Kents have been disposed of in the Borough, at from 75s. to 86s.; new Sussex, 65s. to 75s.; and East Kents, 90s. to 120s. per cwt.

Our advices from Ireland and Scotland are more favourable than those to which we alluded last month. In the former country the growth of wheat has fallen much short of previous expectation; but that in the latter is, unquestionably, good. The extent of the potato disease in Ireland has, as would appear from recent advices, been considerably over-rated.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The metropolitan, as well as the leading country markets, have been very heavily supplied with fat stock from quite the commencement of the month. During its first fortnight, the arrivals of beasts up to Smithfield—and which were principally from the north—were in very middling condition; but their quality has since greatly improved. The sheep have come to hand evenly, nearly the whole of them being fit for cutting purposes. The jobbers having purchased extensively at the various fairs, the trade, assisted by very large importations from abroad, has ruled heavy for beef, and prices have given way quite 2d. per 8lbs. The same observation may be applied to sheep and calves.

Whatever opinions may be advanced to the contrary, it is evident that the numbers of English stock on hand are unusually large. This may be accounted for in a great measure by the impossibility of the graziers disposing, as heretofore, of the supplies which they have from time to time forwarded to London. The Dutch sheep are now reaching us in improved condition. Most of them have their tails cut, and not a few of them exhibit signs of having been crossed by our Downs and some other breeds, in order to reduce their size, and make them more marketable. They still continue, like the beasts, to carry an immense quantity

of loose fat, which renders them favourites with some butchers.

No serious losses appear to have been sustained by the epidemic; in fact, generally speaking, the stock is in a healthy state on most farms.

The annexed supplies have been shown in Smithfield:

	Head.
Beasts.....	22,212
Cows	475
Sheep	173,450
Calves.....	2,491
Pigs.....	2,639

COMPARISON OF SUPPLIES.

	Sept., 1846.	Sept., 1847.	Sept., 1848.	Sept., 1849.
Beasts	18,611	22,492	21,714	19,868
Cows	447	456	421	447
Sheep	154,260	161,340	161,230	168,350
Calves	2,167	3,324	2,707	2,080
Pigs.....	2,591	2,137	3,153	1,957

From the above comparison it will be seen that the supply of sheep has materially increased, and that that of beasts has nearly equalled the high-priced period of 1847.

The bullock-droves have been thus derived:

Northern districts	11,700
Other parts of England	3,000

From Ireland 222 beasts and 38 sheep reached us. The supply from Scotland was confined to 339 head.

COMPARISON OF PRICES.

Per 8 lbs., to sink the offal.

	Sept., 1847.		Sept., 1848.	
	s. d.	s. d.	s. d.	s. d.
Beef,.....	3 0 to 4 8 ..		2 6 to 4 0	
Mutton....	3 8 to 5 4 ..		3 4 to 5 0	
Veal	4 0 to 5 2 ..		3 2 to 4 2	
Pork	4 0 to 5 2 ..		3 10 to 5 0	
	Sept., 1849.		Sept., 1850.	
	s. d.	s. d.	s. d.	s. d.
Beef	2 10 to 3 10 ..		2 4 to 3 8	
Mutton....	2 10 to 4 0 ..		3 2 to 4 0	
Veal	3 0 to 3 6 ..		2 10 to 3 8	
Pork	3 2 to 4 2 ..		3 2 to 4 0	

Compared with several previous months, the arrivals of stock from Holland and elsewhere into London have been large, as will be seen by the following statement:

IMPORTS INTO LONDON.

	Head.
Beasts	5,556
Sheep	19,802
Lambs	1,939
Calves	1,819
Pigs	752

COMPARISON OF IMPORTS.

	Sept. 1847.	Sept. 1848.	Sept. 1849.
Beasts.....	4,000 ..	4,301 ..	4,214
Sheep & lambs	14,683 ..	21,681 ..	17,649
Calves	1,362 ..	1,625 ..	743
Pigs	270 ..	55 ..	528

Newgate and Leadenhall Markets have ruled heavy, and the general quotations have given way quite 2d. per 8lbs.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
Aug. 22	29.80	29.84	42	64	53	S. West	gentle	fine	sun	fine	shower
23	29.83	29.97	49	67	53	S. West	gentle	fine	sun	fine	dry
24	29.97	30.03	53	68	56	S. West	gentle	fine	cloudy	fine	hail
25	30.09	29.90	51	62	61	S. West	brisk	cloudy	cloudy	cloudy	ain
26	29.83	30.16	59	73	58	W., N.W.	gentle	cloudy	sun	fine	ain
27	30.22	29.93	48	67	62	S. West	strong	fine	cloudy	cloudy	rain
28	30.05	30.13	53	69	57	N.W., W. by N.	lively	fine	sun	cloudy	dry
29	30.13	30.15	48	61	53	W. N. W.	gentle	fine	cloudy	fine	dry
30	30.20	30.25	43	63	50	N. Westerly	gentle	fine	sun	fine	dry
31	30.25	30.30	43	58	54	W. by N.	gentle	fine	cloudy	cloudy	dry
Sep. 1	30.33	30.35	50	66	56	N. West	gentle	cloudy	cloudy	fine	drops
2	30.38	30.30	52	70	61	W. by North	calm	cloudy	sun	fine	dry
3	30.30	30.20	51	62	58	Westerly	calm	cloudy	cloudy	cloudy	dry
4	30.27	30.30	52	70	53	N.N. East	gentle	fine	sun	fine	dry
5	30.33	30.30	42	67	53	N. by E., by W.	airy	fine	sun	fine	dry
6	30.30	30.35	42	64	48	N. by E., by W.	gentle	fine	sun	fine	dry
7	30.36	30.40	39	67	52	E. by North	gentle	fine	sun	fine	dry
8	30.40	30.40	42	59	48	E. by North	gentle	cloudy	cloudy	fine	dry
9	30.40	30.32	43	56	53	N. East	gentle	cloudy	cloudy	cloudy	dry
10	30.32	30.30	49	62	52	East, E. by S.	gentle	cloudy	cloudy	fine	dry
11	30.27	30.26	49	67	53	S. Easterly	fresh	cloudy	sun	fine	dry
12	30.27	30.27	47	70	56	E. by North	gentle	fine	sun	fine	dry
13	30.27	30.27	44	66	55	E. by North	fresh	fine	sun	fine	dry
14	30.27	30.27	44	67	54	E. by North	fresh	fine	sun	fine	dry
15	30.25	30.25	48	70	58	E. by North	brisk	fine	sun	cloudy	dry
16	30.25	30.25	54	66	57	E. by North	lively	fine	sun	fine	dry
17	30.25	30.25	53	64	55	E. by North	gentle	fine	fine	fine	dry
18	30.10	29.90	48	68	56	East	gentle	fine	fine	fine	dry
19	29.86	29.76	53	66	58	South	gentle	cloudy	cloudy	cloudy	rain
20	29.66	29.49	55	68	60	S. East	gentle	cloudy	cloudy	cloudy	rain

ESTIMATED AVERAGES OF SEPTEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.41	29.41	76	36	57.8

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
65.56	48.2	56.88

WEATHER AND PHENOMENA.

August 22—Fine, airy day. 23—Fine. 24—Hail, extremely heavy in places. 25—Windy and overcast. 26—Generally fine. 27—Some slight passing showers; solar spots very small about this time. 27—Windy and changeable. Steady fine weather, with rise of the mercury, approaches; the mornings and evenings become very cool, reducing the temperature below the average.

LUNATIONS.—Full moon, 22nd day 9h. 12m. evening. Last quarter, 30th day, 2h., 18m. after.

Sept. 1—Cloudy till 3 p.m.; a few drops. 2—Superb afternoon. 3—Densely cloudy till 5 p.m. 4—Most beautiful. 5, 6, 7—Gentle air; sweet weather, but the nights cold, in low places frosty.

8—Little sun. 9—Gloomy; overcast. 10—Finer and genial. 11—More sun. 12—Superb day. 13, 14, 15—Much alike; hot sun, cold air; heavy clouds occasionally; a few solar spots. 16, 17—Masses of clouds form and pass away. 18—First signs of a change; lovely evening. 19—Hint of rain in the evening. 20—Cloudy masses; gentle rain at night.

LUNATIONS.—New moon, 6th day, 5h., 28m. afternoon. First quarter, 13th day, 8h. 21m., morn.

REMARKS REFERRING TO AGRICULTURE.—An extraordinary dry and cool season, particularly in the early morning, the last days of the period, just as a change approached, being the most genial. The harvest was brought to a most auspicious issue, and we believe will prove satisfactory in all ways. Turnips and kohl rabi want rain, and they probably will have it in abundance. Springs and wells are low—some have failed. Our general average is scarcely a degree minus.

Croydon.

J. TOWERS.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABERYSTWYTH FAIR (Monday last).—The show of cattle was small, particularly horses. The business transacted was very limited.

ASHBOURNE FAIR, Sept. 18.—A short supply of store cattle, and sales flat; in-calvers near at hand were not so well sold as they have been of late, owing perhaps to the shortness of keep in the pastures. There was a poor show of fat cattle for this fair, both as regards quantity and quality. The supply of sheep, store and fat, was good, but many would go away unsold. Beef made 4½d. to 5d.; sheep the same.

BARNSTAPLE FAIR (Thursday).—Several thousand beasts were exhibited. Steers were in profusion, but the demand was not so good as of late. Nevertheless before twelve o'clock hundreds had changed hands at an average of from £7 to £8 10s. Before two o'clock the market had nearly closed, but not above half the cattle shown was sold. The farmers are not in bad spirits, they only seek a fair reduction in their rental. If all landowners would follow the noble conduct of the respected Lord Lieutenant of the county, all farmers would prosper.

BORROWDALE SHEEP FAIR.—The show of sheep was good, and prices of wethers ranged from 19s. to 22s. each; ewes from 13s. to 15s. each. Sales were easily effected, and a great many changed hands. A few cattle were shown, which were sold at somewhat advanced prices. Gilt cows were in request; prices are not high, but there is more life in the trade. The sheep and wool fairs were also held on the two preceding days at Threkeld and Newlands, at both of which, prices, as at the Borrowdale fair, were higher than last year. Wool also sold freely at an improving figure.

BURGH FAT STOCK MARKET.—There was a large show of beasts and a good supply of sheep, but many of the former remained unsold. At market, 260 beasts and 710 sheep. Beef, 5s. 6d. to 5s. 9d. per st.; mutton, 4½d. to 5d. per lb.

CHESTER FAIRS.—There was a good quantity of cheese pitched in the halls last week, but the dairies were principally small. Skim cheese sold at from £1 6s. to £1 12s. per cwt.; middling qualities, at from £1 17s. to £2; and prime Cheshire from £2 14s. to £3. In the horse fair, on Thursday, there were very few animals of high blood; and good roadsters, for which there was a special inquiry, were particularly scarce; there were few first-rate cart-horses in the market. Anything worth purchasing was bought up at higher prices than last year. The show of cattle was slender. Prime fat beasts, fit for the knife, sold at from 4½d. to 5d. per lb.; and milch-cows, over-aged, from £7 to £12, according to quality. More than double the usual quantity of sheep were penned, including a large number of excellent store Southdowns; the average price paid was from 4½d. to 5d. per lb. The show of pigs was equally as good as at any of our old fairs; fine ones, ten weeks old, sold at 13s. each; and porkers and stores at from 4d. to 4½d. per lb.

CHIPPENHAM MONTHLY MARKET.—The supply of cheese was so extensive that, notwithstanding the increased accommodation provided by Mr. Neeld, M.P., a portion was obliged to be pitched on either side of the street, near the New Hall. There could not have been less than 400 tons brought in. The town, as on the preceding day, presented the most animated and picturesque appearance. All the decorations for the demonstration to Mr. Neeld were still remaining, with banners hoisted from nearly every house. The result of this day's market must add largely to its future increase, as, notwithstanding the immense quantity brought in, the bulk sold at fair prices. Broad doubles, 42s. to 51s.; prime Cheddar, 50s. to 57s.; thin, 36s. to 40s.; loaves, 50s. to 56s.

CREWE CATTLE AND CHEESE FAIRS (Wednesday and Thursday last).—The cattle fair was tolerably supplied with cattle. There was, as usual, plenty of buyers, and a good deal of business done at tolerable prices. There was a decided improvement in the show of horses, both in the quantity and quality, over the last fair, and nearly all of the best

description found a ready sale. The supply of both sheep and pigs was very large, and a brisk business was done at improved prices. There was a large quantity of cheese pitched, the greater portion of which was sold. The prices for ordinary consumption ranged from 40s. to 50s.; higher classed dairies from 50s. to 58s., and a choice dairy or two at higher prices.

DRIFFIELD FAIR, Sept. 19.—Harvest being nearly finished, and the market falling on the same day, made the fair a busy one, so far as visitors were concerned. There was a large show of sheep, principally lambs and ewes, which met with a somewhat dull sale, at from 1s. to 2s. per head less than at the last fair. The show of beasts was extremely small, and business flat. A few in-calvers met with good sale from £9 to £10 per head. Beef averaged from 5s. to 5s. 3d. per stone. Lambs from 20s. to 26s.; ewes, 33s. per head.

GLOUCESTER MONTHLY MARKET (Monday) was well supplied with both beef and mutton. Prime heifers were worth full 5d. per lb.; inferior, 4½d. Mutton from 4½d. to 5½d., according to size and quality. There was a larger show of store sheep at market than usual, but trade was dull, at a decline of from 2s. to 3s. per head on what might have been obtained a month or two since.

LECHLADE FAIR, which is noted for cart colts, was this year supplied with a very large number of horses, cattle, and sheep, and attended by a great many dealers. Cart colts and good horses met with a ready sale at good prices. The trade in cattle and sheep ruled dull, although much business was transacted.

LOW BOEROW BRIDGE FAIR.—The show of both beasts and sheep was large, and there was also a good attendance of visitors. There were upwards of 5,500 sheep on the ground; and upon the whole it might be termed a good selling market for all kinds of sheep of a superior breed, but a rather heavy market for the black-faced. The half-bred sheep fetched from 8s. to 12s., and those of the white-faced or improved breed, from 20s. to 25s. Breeding ewes were much looked after. The demand was also good for present calving cows.

MASHAM FAIR.—On the first day an immense quantity of sheep was shown; of the good bred sheep there was not quite so large a number as on former years, but they were better in quality: the farmers and graziers, however, were much dissatisfied with the prices obtained for them. For good bred lambs there was but a slow sale at from 20s. to 24s. each; mutton scarcely fetched 5d. per lb. Of the half-bred or Masham lambs, for which this fair is famous, we never saw so large and good a show; the demand for them seemed great, at from 10s. to 15s. per head, at which prices a tolerable clearance was effected; indeed, we have never before seen so many sheep of this description change hands; and we understand that many large farmers and graziers are now grazing this description of stock, and find them very profitable. There was also a good show of tups, and some very fine sheep were exhibited both for sale and hire by some of the neighbouring farmers, amongst which we particularly noticed those from the flocks of Mr. Carter and Mr. T. Ascough. Much business was transacted in this department, but a lower price than on former years. On the second day there was a good show of horned cattle, for which we had a good demand, but at prices much lower than anticipated. Beef sold at from 5s. to 5s. 6d. per stone, but very little reached the latter quotation; holding stock met with slow sale, and prices low; good calving cows were in request, and sold better in proportion than any other stock. We never saw so many Irish beasts shown at these fairs as on this occasion, and never so fresh in condition. In the afternoon there was a tolerable show of horses and ponies, and much business transacted amongst the latter.

MALDON FAIR.—An improved business was done. There was a fair show of all descriptions of stock and horses, many of which fetched good prices. A great many sheep and lambs were on sale, the latter realizing from 22s. to 26s.—a shilling or two above their price last year.

MIDDLES Moor FAIR.—The show of half-bred lambs (called "Masham lambs"), bullocks, and other stock, took place, for the first time, at Middlesmoor, and far exceeded the expectation of the promoters. 2,817 lambs, wethers, and other sheep, near 200 bullocks, and a number of pigs, horses, and cows, were offered for sale at this romantic and delightful village. Near 1,400 lambs were disposed of at prices varying from 10s. to 12s. 6d. each, which, notwithstanding the depressed state of the agricultural interest, were considered remunerating prices. A number of bullocks also changed hands at fair and moderate prices.

MOFFAT SHEEP SHOW.—This long established and most prosperous annual gathering of the ruralists of Upper Annandale, was held on Friday last. The competing stock—Cheviots, of course, especially—were the great object of attraction; and the high character of the show was this year, no easy matter now, fully sustained. The animals were in splendid order, and looked all the better that sunshine, in place of rain, played upon their fleecy backs. In cattle the competition was very keen, and the stock shown superior. The show of tups for sale was also very good, though the numbers were not so great as last year. There would be about 750 tups on the ground, chiefly Cheviots; for these there was a fair ready sale, and the principal portion found buyers. The quality was excellent, and prices ranged from £2 to £4. In a few instances higher sums were given for particular animals, but the general rate for a good one was from £3 to £3 3s. Some Cheviot Dimmots made £2 10s., and tup lambs about 20s. Owing to the sales on previous days the number of Leicesters was small, and demand rather dull; good animals generally made about £4, nor was this the highest figure. There were some fine black-faced tups shown, but we did not hear the prices given for this description. There were a few lots of second and third Cheviot lambs shown, which were readily picked up at from 5s. to 8s. 6d., being worth from 1s. to 1s. 6d. more than last year. A lot of black-faced lambs made 6s. There were a few lots of cattle, but they were not in the same request. A couple of three-year-old Highland bullocks made nearly £9 a piece, and five three-year-old Galloway queys, fit for the butcher, £12 each. There was a great deal of business done in Cheviot crock ewes, several thousands being sold, although they were not on the ground. There was a good demand for them at from 15s. to 20s., and the prices were quite 1s. a head up from last year.

NEWARK FORTNIGHT MARKET.—There was a very good supply of stock; buyers were, however, rather slow in their movements, but a considerable quantity of sales were ultimately effected, at prices about as last quoted. There were 794 sheep and 76 beast penned.

NORTHAMPTON FAIR, on Thursday last, was numerously attended. The supply of fat sheep was very good. Best wethers made from 3s. 4d. to 3s. 6d. per stone of 8lbs.; fat ewes from 2s. 10d. to 3s. Store sheep were also in good supply, but the trade in them was dull at a reduction of about 2s. a head from the prices at our last fair. Of lambs there was a fair supply, but lower prices had to be submitted to to effect sales. Forty-three very fine Cotswold tups, belonging to Mr. Cother, were exhibited for sale. Thirty-eight were either sold or let by auction, by Messrs. Lyne and Cother, who also sold nine very fine pure south-down shearing rams, belonging to Mr. Bulling, of Great Tew. There was a large supply of fat beast of all descriptions; also of stores, including Hereford, Devon, Irish, and Scotch beast in very good condition; but trade was without animation. There were many very useful new milch cows, and a fair business was done. Horses were plentiful of nearly all descriptions. In the cheese fair the supply was rather limited; business tolerably good. Best cheese made about 6½d. per lb.; inferior quality from 3½d. upwards.

PARTNEY FAIR, on Wednesday last, was well supplied with sheep and lambs, more than 400 having, in consequence of the scarcity of keeping, been brought by rail from the neighbourhood of Spalding. The trade was not so brisk as at the last fair, and prices were the turn lower. Lambs from 12s. to 2½s.; drope ewes from 20s. to 32s. Mutton, 5d. to 5½d. per lb. A lot of superior ewes, belonging to Mr. Vessey, of Hulton, was purchased by Mr. Fisher, of Weston, near Spalding, for 45s. each. They had brought up lambs this season.

PETERBORO' FAT STOCK MARKET on Wednesday had a full supply, there being above 600 Sheep; but although

fewer shown than last week, the trade was not so brisk, and in some instances lower prices were submitted to. There were above 50 Beasts, for which there did not exist a sufficient demand, and complaints were made of the depressed value of stock. On Saturday a fair supply of young Stores. There were about 180 Beasts, and 600 Sheep. Trade dull, owing partly to the scarcity of grass-keeping, from the long continuance of dry weather. Above 260 Pigs, but not much business doing. Pigs under three months old not worth more than 10s. 6d. each.

REDDITCH FAIR (Monday) was well supplied with stock of most kinds, and tolerably well attended by dealers and others, but business, upon the whole, was flatter than for some years. The following was the average price at which business was done:—Good ewes and wethers from 5d. to 5½d.; heifers, 5d.; inferior qualities, 4½d.; strong store pigs, from 30s. to 45s. The supply of horned cattle and small pigs was tolerably good; in the latter very little business done.

TEWKESBURY FAIR (Wednesday).—There was a plentiful supply of cattle. Prime qualities had a ready sale at from 5d.; inferior, 4d. to 4½d. There was a good supply of sheep. Ewes fetched 4½d. to 6d.; wethers, 5d. to 5½d. There were no fat pigs, and stores were scarce, and declining in price.

THATCHAM FAIR.—The show of horses and cow cattle was large, and of good quality, and a considerable amount of business was transacted, at prices quite equal to those obtained at the neighbouring fairs. The supply of sheep was also very good, and the sales were generally made at terms quite as high as at Wilton fair. The attendance of agriculturists and dealers was numerous.

WINCHESTER FAIR.—The weather being very fine, a larger number of persons were present than usual. The horse fair was thin, and principally of the cart kind, which were not much in request. There was a very short supply of cheese, which met with a quick sale, at a reduction in price.

WORCESTER FAIR, (Thursday night).—This great annual fair for the sale of hops, cheese, and cattle, has been held here to-day. As far as regards hops there was a very large market, but business was not brisk until the evening, the planters being unwilling to sell at the rates offered by the dealers. The highest price obtained was £5 5s. per cwt., but this was only in one known instance. About 1,400 pockets of new, and some 50 pockets of old, were pitched. Generally the new were of good quality, and some 700 or 800 pockets were sold before night. The following were the current prices.—New Worcesters, £3 10s. to £4 4s. per cwt.; yearling do., £4 10s. to £4 13s. per cwt.; new Kents, £4 to £4 6s. per cwt.; new Sussex, £3 5s. to £3 15s. per cwt.; yearling Kents, £4 10s. to £5 per cwt.; yearling Sussex, £4 5s. to £4 15s. per cwt. The picking has only been partially got through, and nothing like a full supply has therefore been brought to market to-day. The cattle fair was unusually small. About 5,000 sheep were penned, and there was a fine show of rams, some of which were sold by auction at £5 10s. each. The market, on the whole, however, was dull, and many things were driven away unsold. Store pigs were numerous supplied, but the sale was dull. Feeding pigs fetched about 7s. per score. Beef, 5d. per lb.; inferior animals, 4½d. Mutton from 5d. to 5½d. There was not much doing in the horse fair. This part of the fair has been falling off for some time. A great portion of this line of business is transferred to the great neighbouring fairs of Pershore and Brompton Brian. The cheese fair, hitherto held in the streets of the city, was this year held in the New Corn Exchange built by the farmers (there being a second built by the citizens). Best Derby sold at 47s. to 56s. per cwt.; seconds from £2 to £2 2s.; skim 24s. to 30s. per cwt. The pleasure fair had its usual number of votaries, and was kept up until midnight.

FAIRS IN WALES. **PINAS MAWDOY.**—There was very little beef, but many store cattle, which sold very low; useful horses found ready purchasers. **WELSHPOOL** was a very large one, there being plenty of stock. Best beef made about 5d. per lb., but the general price was 4½d.; fresh barrens sold well, but at low figures; useful cows and calves and calving cows sold rapidly. There was a great number of horses; the best sold readily. **LLANDILOES.**—There were but few things here, and fewer customers to buy them; what was sold made but little money.

BANAGHER FAIR.—**IMPROVEMENT IN PRICES.**—**AGRICULTURAL PROSPECTS.**—The following letter, from the

Ballinasloe correspondent of the *Dublin Evening Post*, gives an account of the great fair of Banagher, King's County, which commenced on Monday, the 16th instant, and terminates this day. This, next to Ballinasloe, is the principal cattle and sheep fair in Ireland. The graziers and farmers have been looking with deep anxiety to the prices at this fair, which has far surpassed all calculation, and, in every respect, is the best and most satisfactory one for the sellers that has occurred in this country for a long period. The *King's County Chronicle* describes it as "the very best fair for the last six or eight years, although in some few instances higher figures might have been obtained at former fairs. Prices for sheep averaged from 4s. to 6s. over the rates of last year." The horned cattle fair was immense: but the buyers were cautious in purchasing, from apprehensions of a distemper in cattle: "BALLINASLOE, Sept. 18.—The autumn fair of Banagher commenced on Monday (the 1st day), heretofore a very celebrated and still an important one. It continues four days. Immediately preceding the Ballinasloe fair, to some extent it regulates the price of stock, as the harvest prospect is then determined; but in latter years extensive breeders have confined themselves to the more certain and better determined period of the October fair of this town, when the Leinster buyers and the English speculators have come to a decision regarding produce and winter provender. The grazier and breeder knew this every whit as well as the best made-up Smithfield man; but sharp though they are at both sides, the judgment, prudence, and common sense of those men, with different interests, produce an equitable adjustment of prices, and establish a standard of value by which, as in all lotteries, in all games of chance, many may win, and many lose. The weather was fine, and the attendance of the neighbouring gentry both numerous and respectable. The business men numbered many, and their disposition to go to work with vigour was evident by the 'early morning' they gave the wool-drivers. Before seven o'clock the traffic was in earnest, and it was soon apparent that the holders knew their position, and sturdily maintained it; and the result is, that the present fair of Banagher has turned out the best for the last six years for the sellers. Several of the lots exhibited very fine breeding,

and the sheep were in excellent condition. There was a rise of from 4s. to 6s. in the different classes of breeds over this time twelve months. The principal demand was for lambs, ewe hoggets, and two-year-old ewes. The Marquis of Clanricarde had the finest lot of two-year-old wethers in the fair; they were sold at two guineas each. Lambs averaged at 20s. to 25s. 6d. each; hoggets, 27s. 6d. to 36s.; ewes, 32s. to 42s.; two-year-old wethers, 35s. 6d. to 41s. 9d. Total sales, 9,380; unsold, 3,400. TUESDAY.—The horse fair (a rare circumstance now in this part of Ireland, as we have lost, and do not deserve a character for breeding good stock) was well supplied both with trained and untrained animals of a good class, which commanded high figures. Prince Louis Napoleon had his envoy there, purchasing for all but an uncrowned monarch, now viewing his fleet at Cherbourg, but longing to show how fleet he is on land, by gaining some of the animal purpose we have in Ireland. Buyers for our own good Queen selected largely, and every sound young horse of which hopes were entertained of becoming a charger for the heavy trooper or Light Dragoon was bought up without delay. Hunters and well-shaped harness horses readily changed hands for the English markets, where the Encumbered Estates Court has not a 'rod in pickle' for the aristocracy, and they may ride in carriages still, and still longer while they continue to act the part of good and considerate landlords. So great was the traffic in horses at this fair, that the dealers turned a considerable penny by reselling. THIRD DAY.—The cattle fair was bad. The supply not good, nor were sellers numerous—the distemper awed men, and speculators paused in investing their means heavily in black cattle. The highest price for heifers was £12 16s. Many left the fair at an early hour unsold. No one now expects the prices which were obtained before the tariff, but it was not a fear of American beef or Holland skiltons which operated (none can equal our own), but the extent of the disease now so prevalent amongst the stock throughout Ireland which operated, and made thinking men consider whether they could not otherwise turn their money to better account. Short as the time is, you will find that the Ballinasloe fair will right matters."

REVIEW OF THE CORN TRADE DURING THE MONTH OF SEPTEMBER.

Towards the close of August the weather underwent a favourable change; the early part of the month had been wet, and by no means auspicious for harvest work; subsequently it cleared up, and scarcely a drop of rain fell from the commencement until the 21st of September. The latter part of the harvest has, consequently, been finished in a highly satisfactory manner; there has been no occasion to hurry the corn into the stack-yards until it was perfectly dry and fit for carrying; and there has been less waste and damage than generally takes place with so protracted a harvest.

The greater part of the grain secured during the month has been carted in excellent condition; but this could not remedy the defects and injury consequent on a cold wet summer, and the general yield and quality of this year's crops disappoint the growers.

On some farms, and even in some whole districts, the deficiency may not be great; but these are certainly the exception, and, as a general result,

we regard the harvest of 1850 as inferior to that of moderately good average seasons. Owing to the very great difference which exists in different localities, it is this year more than usually difficult to arrive at anything like an accurate estimate respecting the aggregate produce of the kingdom; and, though we have been very particular and careful in our inquiries, we still feel considerable uncertainty respecting the actual state of affairs. It may, however, be regarded as an ascertained fact, that wheat is a short crop, and that a large proportion of the same is of inferior quality. The principal causes of the deficiency have been blight, and the injury caused by the crops being very extensively lodged at an early period of their growth by heavy rains and high winds. The western and southern parts of the kingdom have escaped these visitations better than the east and some of the north-eastern counties of England. Lincolnshire, Cambridgeshire, and parts of Yorkshire have suffered greatly from the causes just referred to;

and, on some of the fen lands, where the produce in favourable seasons is large per acre, the deficiency will perhaps amount to about one-fifth. This must, however, be regarded as an extreme case; but, as there are no important districts in which the yield exceeds an average, and numerous parts in which the produce is estimated short, the aggregate will certainly be below the requirements of the country, and we shall unquestionably have to import largely from abroad.

That farmers cannot pay rent, &c., and derive a profit on their capital and industry, with short crops and present prices, is certain; still we do not see much prospect of any material improvement in the value of agricultural produce; and our impression is, that whilst this country receives the surplus growth of the whole world free of duty, we shall rarely witness a higher average price for wheat than 45s. per qr.

Barley promised well in the early part of the summer, and, even up to the end of July, it was thought that, both in regard to quantity and quality, that crop would prove satisfactory; the rain and high winds experienced in August were, however, very unfavourable in their results; and, since harvest, it has been discovered that the quality of the new barley bears no comparison to the growth of last year, and that the yield to the acre, though not so bad as wheat, is nevertheless barely equal to a moderately good average. Really fine malting samples are likely to be very scarce, and will therefore, in all probability, maintain a relatively high standard of value; and the commoner sorts will, we think, bring comparatively better prices than wheat, owing to the fact of the crop of this grain having yielded indifferently in many of the principal countries of Europe, where wheat has given a good return.

Oats have been less extensively grown on this side of the channel than usual; but in Ireland a larger breadth than in ordinary seasons was, we believe, sown last spring. This crop, being less liable to injury from wet, did not suffer to the same extent as either wheat or barley. In England the yield to the acre is tolerably good; and in the sister isle the produce is allowed to be larger than for some seasons past, and the quality is also well spoken of.

Beans are decidedly short and of inferior quality in all parts of the United Kingdom; and peas have, in very many cases, proved almost a total failure.

The foregoing estimate of the corn and pulse crops is less full and defined than we could wish; but we can only repeat what we stated at the onset, that, from the great variety of the produce of different descriptions of soil, from the local character of the storms experienced at different times

during the summer, and other circumstances of an unusual kind, it has become almost impossible to form a computation of the result of this year's crops with that degree of accuracy to enable us to say what the exact deficiency in each particular article may be; but, taking the produce of human food as a whole, there is reason to believe that the yield is far below that of good average seasons; and it follows therefore that, with present prices, farmers as a body must be heavy sufferers.

We have frequently regretted the want of statistical information on agricultural subjects, and this want is now more manifest than ever. Whilst the fluctuating scale of duties was in operation many of the large merchants and corn-factors deemed it necessary to obtain as accurate information as possible respecting the probable wants of the country, so as to govern their future operations; and, with this view, considerable expense was gone to by private individuals, in collecting information, by despatching parties practically acquainted with the matter into the agricultural districts, at various periods of the year, to ascertain what stocks remained on hand, the appearance of the crops, and, finally, the result of the harvest.

The information thus gathered afforded some data for calculation, and a tolerably accurate estimate was arrived at. Now, however, matters are altered; it is enough to know that large supplies will continue to pour into this country, from the continents of Europe and America, without at any time affording much margin for profit, as the foreign dealers and merchants, being well instructed as to the state of the markets here, always manage to get the lion's share of any pecuniary advantage appertaining to the transaction; hence, there is no longer any inducement to incur expense to collect statistics, for whether prices here are 40s. or 50s. or 60s. per qr. for wheat, there will be just the difference of freight and charges between our quotations and those on the continent.

The potato disease appears to have assumed a new character this year. In former seasons, when the haulm was attacked, the disorder almost invariably affected the tuber, and a large portion of the produce was totally destroyed: this was regarded as the characteristic of the malady; and it was consequently concluded, when in July and August last the haulm became blacked and rotten, that the potatoes were lost; but on being dug up, this does not prove to be the case. The early planted, which had arrived at maturity, escaped almost uninjured; and the later kind do not, in general, present the same appearance as formerly; they are not rotten, but the tuber ceased to grow when the stalk decayed, and they are consequently so small as greatly to diminish the quantity to the acre. An

intelligent correspondent, writing from Kildare, in Ireland, says, in many cases the late potatoes vary in size from that of cherries to crab-apples; and it follows, therefore, that the produce is very much below what was expected. Hitherto, no scarcity of potatoes has been experienced, either on this side of the channel or in Ireland; but that they are going into consumption so rapidly as to threaten short supplies and high prices during the ensuing winter, is certain.

There has not been much change in the general tone of the grain trade since our last, and prices do not differ materially at present from what they were at the close of August. Farmers have thrashed new wheat rather freely, and the markets in the agricultural districts have been tolerably well supplied; the millers having, however, deemed it prudent not to allow their stocks to run low, and the consumption of flour having been large, previous rates have been steadily maintained.

The arrivals of wheat coastwise into the port of London have averaged somewhat over 3000 qrs. per week, and nearly the whole of the supply has been of the new crop. The quality of the Essex and Kentish wheat has proved better than expected, and the millers express themselves very well satisfied with the meal properties of this year's growth of wheat, which has induced them to purchase more extensively than they might have done if the condition had been less satisfactory. Even the supplies from Lincolnshire and Cambridgeshire, though of much inferior quality to the wheat grown in the home counties, and of light weight, are found to produce good flour, and to be capable of being manufactured with a comparatively small admixture of old.

In the early part of the month prices had rather a downward tendency at Mark Lane, and on Monday, the 2nd September, the commoner descriptions of English wheat declined about 1s. per qr. in value. On that day week the millers appeared more disposed to purchase; and on the 16th the reduction was again recovered. Since then no change has taken place, and we continue to quote good samples of both new and old, white 48s. to 50s., and red 42s. to 44s., extra fine 1s. to 2s. per qr. higher.

The arrivals of wheat from abroad into the port of London have been smaller this month than for some time past, and it is therefore fair to infer that the stocks in granary have rather diminished; as yet, however, we have a plentiful display of samples, and there have been no symptoms of scarcity. The country demand has at no period of the month been extensive, and the town millers have been satisfied with purchasing just sufficient to replace what they may have withdrawn from their stocks.

Business has consequently been of rather a retail character; but importers have remained very firm, and there have been fewer offers of free on board cargoes than earlier in the season. In regard to prices we have no change to report; good red Baltic, French, and Belgian wheat having brought 43s. to 45s., and fine Rostock 1s. to 2s. per qr. over the last named rate, whilst for the finer descriptions of Danzig 48s. to 50s. per qr. has been paid. For Polish Odessa on the spot 39s. to 40s., for superior parcels 1s. to 2s. per qr. more has been asked; and a good many cargoes off the coast have been taken for Ireland at 38s. 6d. to 39s. per qr., cost, freight, and insurance. The imports of foreign wheat into Great Britain during the month ending 5th Sept. were not so large as the preceding month; still 312,422 qrs. were entered for home consumption, besides 288,441 cwts. of flour.

The sale for flour has been tolerably free since our last, and this was more especially the case during the week ending 14th inst., the bakers having apparently allowed their stocks to run somewhat lower than they deemed prudent. The nominal top price has remained stationary at 40s. per sack, and very little change has occurred in the value of other sorts. For some weeks past the arrivals from France have been comparatively small nor have we received much from America (til within the last week); to this we are inclined in some measure to attribute the improved sale for English, and the steadiness of prices. Good qualities of French have lately realized 34s. to 35s. per sack, without difficulty; and the best Paris whites have sold nearly as high as the higher grades of London-manufactured flour.

No supply of new barley worth naming came to market until Monday the 9th inst., and the prices then established have since been maintained. The quality of the majority of the samples hitherto brought forward has proved very inferior to the growth of last year; the best malting sorts may be quoted 29s. to 30s., and the commoner descriptions 27s. to 28s. per qr. Whether these rates would be supported if supplies were to increase materially may be questioned; still we do not think that any decline of consequence is likely to occur in the value of the finer sorts.

The arrivals of barley from abroad, though not particularly large, have been quite as liberal as we were led to expect, considering the high range of prices at many of the continental ports. The prevailing opinion is that the receipts will hereafter fall off, and holders have consequently manifested more disposition to raise their pretensions than to accept lower rates. The demand has been steady for grinding qualities; and where it has been found impracticable to effect a clearance from on board

ship, importers have not hesitated to incur landing expenses rather than accept lower prices. Light qualities have brought 20s., and good heavy parcels 22s. to 23s. per qr.—rates fully as high as those current about this time last month.

Malt has come rather sparingly forward, and the brewers have taken the finer descriptions of last year's make freely, at prices slightly in advance of the rates current in August. The best sorts may now be quoted 52s. to 55s., and other kinds have commanded corresponding terms.

The market has been very indifferently supplied with English and Scotch oats, and the receipts from Ireland have hitherto been small; from abroad we have, however, received liberal arrivals, which latter circumstance has prevented any advance occurring in quotations. The greater part of the foreign supply has been from Russia, and as it is supposed that the bulk of the shipments from thence are now to hand, the dealers calculate on a period during which the receipts may be expected to be comparatively light. Under this impression they have bought the Rigas and Archangels pretty freely, and only a moderate quantity now remains in first hands. Prices have scarcely varied, and may be quoted 16s. to 18s. per qr. for feed, and 18s. to 21s. for foreign Polands and similar sorts. The new Irish black oats have brought 16s. 6d. to 17s. per qr., though not of heavy weight. We have hitherto no arrivals of potato oats from thence, and heavy parcels would probably exceed 20s. Old Scotch have become very scarce, and are worth from 21s. up to 25s. per qr. New Lincolnshire feed have sold, according to weight and condition, from 16s. to 19s. per qr.

Beans have come to hand sparingly; and few of the samples of new which have hitherto appeared have proved of ordinary quality. Fine old have consequently met with a fair share of attention, and have commanded fully as high prices as those current last month. Egyptian beans have been in good request, and the imports having been moderate, stocks have been gradually diminishing.

Peas have fluctuated more in value than any other article; all that have been brought to market have been taken freely by the splitters, and prices advanced from day to day until Monday, the 23rd inst. The highest point attained for good breakers was 38s.; and some of the seedsmen have paid 40s. to 42s. per quarter for white peas. Blue may be quoted from 38s. up to 50s. per quarter, according to quality. Latterly, prices of white peas have given way 1s. to 2s. per quarter; but as there can be no doubt that the crop is exceedingly deficient both in this country and on the continent, no material reduction is likely to occur. Grey peas have lately brought 32s. to 33s., and fine maple

34s. to 35s. per quarter, with but few offering at the rates named.

Owing to the Irish markets having been liberally supplied with potatoes, the demand for floating cargoes of Indian corn has not at any period of the month been particularly active; there has, however, been no disposition to press sales, and where bargains have been closed, similar terms have been realized to those current at the close of August.

The remainder of our space we shall devote to a short notice of the corn trade abroad, though we have nothing very new or interesting to communicate, scarcely any change having taken place in the position of affairs at any of the leading continental markets.

Since harvest has been concluded in Germany, Russia, Poland, &c., the yield of wheat has been discovered not to be so good as was expected previous to the commencement of cutting; still, as a whole, the result of the wheat harvest over a large portion of the north of Europe is, we believe, satisfactory, and quite equal to that of average seasons. Rye, on the other hand, is admitted on all hands to be a decidedly short crop; and most kinds of spring corn and pulse are also stated to be deficient.

In Holland and Belgium the character of the weather during the summer was similar to that experienced in Great Britain, namely, too humid for wheat; hence, the produce of that crop has disappointed the Dutch and Belgian growers; and it is nearly certain that those countries will not have much to spare for shipment; indeed, it is probable that before another harvest can be secured, Holland will have to import both wheat and rye (the latter largely) from the Baltic.

The result of the harvest in France is variously estimated. There can be no doubt that since the trade with England has been thrown open, agricultural pursuits have received a great stimulus in France, and that more land has been brought into cultivation. The yield to the acre may not be so great as in 1849, but we believe that a greater breadth was sown; and even with an increased consumption, consequent on the more settled state of politics, that France will still have a considerable quantity of wheat and flour for exportation. At present, prices are too high all over Europe, as compared with quotations here, to hold out any inducement to ship largely to Great Britain; but the value of the article is generally above the cost of production abroad: we are therefore inclined to think that farmers will, after a while, supply the different markets freely, and that prices will then arrange themselves at the principal continental ports in accordance to the British demand.

By the latest accounts from Danzig it appears that considerable purchases of wheat had been

made, notwithstanding the discouraging accounts from hence, at very full terms; say 43s. to 44s. for moderately good high mixed of 61lbs. to 62lbs. weight, and 45s. per quarter, free on board, for choice parcels; whilst for the commoner kinds corresponding rates had been realized.

At Königsberg prices were rather more moderate; equal to 40s. being about the value of high mixed, 38s. mixed, and 36s. per quarter, free on board, for fair samples of red.

At most of the ports from which we are in the habit of receiving the best red wheat, old stocks appear to be almost entirely exhausted; and supplies of the new crop having up to the date of the most recent advices come forward but slowly, extensive transactions had been impracticable.

At Stettin, Rostock, Stralsund, Greifswald, &c., very little business had consequently been done, holders of the little remaining on hand having asked higher rates than buyers had been disposed to pay. Quotations may be said to range from 40s. to 43s. per quarter, free on board, at the places named, which with freight, insurance, &c., would bring the cost here above our market value.

At Hamburg, Rotterdam, and Antwerp, this is also the case just now, and but little is therefore being done at the moment, at either of these ports, for export to England; and it is by no means improbable that the supplies from abroad may for a time be less extensive than we have lately been used to.

From France we may calculate on receiving some quantity of flour, there being still a trifling margin for profit on shipments from thence to this country. Our main source of supply is, however, likely to be America; all the accounts from the other side of the Atlantic agree in describing the wheat and Indian corn crops as abundant, and far exceeding what is likely to be required for their own consumption. Prices had already begun to recede at the leading shipping ports, and considerable purchases had been made with a view of consigning to British markets. At New York, on the 13th inst., prime Genessee flour was obtainable at about 4½ dollars (19s. 8d.), and secondary sorts from 16s. 6d. to 19s. 2d. per barrel. The shipments from thence from the 1st to the 10th of September had amounted to 15,581 barrels of flour, 5,114 bushels of wheat, and 5,372 bushels of Indian corn, and from some of the other ports the exports had been on a corresponding scale. In the month of August 148,462 barrels of flour and 45,954 bushels of wheat had been shipped, against 74,417 barrels of flour and 9,680 bushels of wheat in August, 1849.

Stocks of old grain and flour at the ports on the seaboard were not large, but the growers in the interior were believed to hold considerable

quantities, the low range of prices throughout the last twelve months having rendered many of the farmers unwilling to incur the expenses attending the transit from the interior to the coast.

From Odessa the reports do not speak very favourably of the crops, but the result of the harvest had hardly been ascertained, and we must wait for further information from thence before we can form a judgment as to the probable extent of the imports from the Black and Asaff seas.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	NEW	OLD.
WHEAT, Essex and Kent, white	44 to 48	42 to 50
Ditto, fine selected runs	48 52	49 52
Ditto, red	40 43	43 44
Ditto, extra	43 46	44 45
Norfolk, Lincolnshire and Yorkshire ..	38 44	41 44
Ditto, white	40 46	43 46
BARLEY, English, malting and distilling ..	— —	25 27
Ditto, Chevalier	— —	28 29
Ditto, grinding	— —	21 23
MALT .. Essex, Norfolk and Suffolk ..	43 45	44 48
Kingston, Ware, and town made	45 52	48 54
OATS, Essex and Suffolk	— —	16 17
Lincolnshire and Yorkshire (Polands) ..	— —	18 19
Ditto, feed	— —	16 17
Devon & West Country, feed	— —	14 16
Northumberland and Scotch, feed ..	— —	18 22
Dundalk, Newry, and Belfast, potato ..	— —	16 18
Limerick, Sligo, and Westport, potato ..	— —	17 19
Ditto, feed	— —	16 17
Cork, Waterford, Dublin, Youghal, and		
Ditto, white	— —	15 16
Galway	— —	12 14
Clonmel, black	— —	15 16
BEANS, Mazagan	25 26	26 28
Tick	26 27	28 30
Harrow	— —	28 32
Pigeon, Heliogland	— —	28 30
Windsor	— —	25 27
Long pod	— —	25 28
PEAS, non-boilers	— —	28 30
White, Essex, and Kent, boilers	33 35	30 32
Ditto, fine Suffolk	34 36	30 35
Maple	31 33	30 32
Hog and grey	28 31	28 31
FLOUR, best marks (per sack of 280 lbs.) ..	— —	35 40
Norfolk and Suffolk, ex-ship	— —	29 34
RYE	— —	23 24

FOREIGN GRAIN.

	Shillings per Quarter.	
WHEAT, American, white	42 to 46	
Canada	none	—
Dantzic and Königsberg	44 48	
Dantzic, fine white, extra quality	48 50	
Stettin and Hamburg	40 44	
Danish	39 42	
Rostock, Pomeranian and Rhine	43 47	
French and Belgian, white 42s. to 45s. ..	red 40 44	
Mediterranean, Odessa, and St. Petersburg ..	35 39	
Black Sea (nominal) hard to soft	35 38	
Buck or Brank	23 26	
BARLEY, malting	24 26	
Grinding and distilling	21 23	
Hamburg, Dantzic, Königsburgh, and Riga ..	21 22	
Danish, Mecklenberg, and Pomeranian	21 22	
OATS, Dutch, brew. Poland, Friesland, and Groningen	18 20	
Danish and Swedish	15 18	
Russian	16 17	
BEANS Small	25 28	
Egyptian	20 22	

PEAS, white boilers	32	35
Yellow ditto	30	33
Non-boilers	28	30
MAIZE, white	28	31
FLOUR, American, sweet	23	25
Ditto, sour	21	23
Canadian, sweet	22	24
Ditto, sour	21	22
French, per sack	28	33
RYE MEAL (per ton)	£6 6s. to £6 10s	
INDIAN CORN MEAL (per brl. of 196 lbs.)	nominal	

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.	Barley.	Oats.	Rye.	Beans	Peas.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Aug. 17, 1850..	43 8	22 3	18 4	23 0	28 2	26 5
Aug. 24, 1850..	43 6	23 0	17 9	20 10	28 1	26 3
Aug. 31, 1850..	43 6	22 4	17 9	23 4	28 11	26 11
Sept. 7, 1850..	43 2	23 0	17 11	25 4	28 9	27 10
Sept. 14, 1850..	42 10	23 9	17 4	26 10	29 7	28 9
Sept. 21, 1850..	42 7	24 10	17 1	26 4	29 5	29 5
Aggregate average of last six weeks	43 2	23 3	17 8	24 3	28 10	27 7
Comparative age same time last year	44 2	26 7	18 8	26 6	31 4	29 4
DUTIES	1 0	1 0	1 0	1 0	1 0	1 0

LONDON AVERAGES.

	£	s. d.		£	s. d.
Wheat..	3,488	qrs. 6 11	Rye....	24	qrs 1 8 1
Barley..	138	1 7 8	Beans ..	131	1 8 8
Oats	39	0 19 8	Peas	306	1 12 1

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Gazette.	Friday's Av.	Averages from the corresponding Gazette in 1849.	Av.
	Qrs. s. d.		Qrs. s. d.
Wheat ..	103,850 .. 42 7	Wheat ..	92,079 .. 41 9
Barley ..	6,208 .. 24 10	Barley ..	6,475 .. 27 1
Oats	15,675 .. 17 1	Oats	11,710 .. 17 10
Rye	795 .. 26 4	Rye	709 .. 25 11
Beans	4,048 .. 29 5	Beans	1,252 .. 29 9
Peas	1,099 .. 29 5	Peas	1,009 .. 30 0

ACCOUNT SHEWING THE QUANTITIES OF GRAIN AND FLOUR IMPORTED INTO THE UNITED KINGDOM DURING THE MONTH ENDED 5TH SEPT., 1850, THE QUANTITIES ADMITTED FOR HOME CONSUMPTION DURING THE SAME MONTH, AND THE QUANTITIES REMAINING IN WAREHOUSE AT THE CLOSE THEREOF.

Species of Grain.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
Wheat, from British Possessions	qrs. bush. 1713 5	qrs. bush. 1713 5	qrs. bush. 9 1
Barley, do.	—	—	—
Oats, do.	—	—	—
Peas, do.	1215 0	1215 0	—
Beans, do.	—	—	—
Maize or Indian Corn, do.	—	—	—
Wheat, foreign	316708 4	310708 4	12044 1
Barley, do.	100408 2	100908 2	251 5
Oats, do.	126668 2	126753 2	171 1
Rye, do.	3915 4	3015 4	106 7
Peas, do.	11887 5	12 57 5	890 0
Beans, do.	10737 2	21317 2	6121 3
Maize or Indian Corn, do.	80637 1	80627 1	17 7
Buckwheat	—	—	—
Beer or Bigg	—	—	—
Flour from British Possessions	cwts. qrs. lbs. 10385 1 4	cwts. qrs. lbs. 10385 1 4	cwts. qrs. lbs. 10 3 3
Flour, foreign ..	276189 0	8278056 1 8	5044 2 1

BREAD.

The prices of wheaten Bread in the metropolis are from 6½d. to 7½d.; and household do., 5d. to 6d. per 4lbs. loaf.

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING SEPT. 14, 1850.

PRICE.	Aug. 10.	Aug. 17.	Aug. 24.	Aug. 31.	Sept. 7.	Sept. 14.
44s. 1d.	—	—	—	—	—	—
43s. 8d.	—	—	—	—	—	—
43s. 6d.	—	—	—	—	—	—
43s. 2d.	—	—	—	—	—	—
42s. 10d.	—	—	—	—	—	—

SEED MARKET.

FRIDAY, September 27.

New Canary is very slow in sale, at barely last week's prices. Linseed and Rapeseed continue to move off steadily. Tares, the supply of which is large, are again lower. All other Seeds, including Cakes, command very little attention.

Duty was paid on the following quantities of Cloverseed up to the 21st inst:—

	1850.	1849.
London	55,929	88,373
Liverpool	7,691	9,742
Hull	24,927	35,633

Stock in bond, Sept. 5, 28,333 cwts.

BRITISH SEEDS.

Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3lbs. each) .. £8 0s. to £9 0s.
 Cow Grass (nominal) ..—s. to —s.
 Trefoil (per cwt.) ..—s. to —s.
 Rapeseed, (per last) new £25 to £27 .. old £— to £—
 Ditto Cake (per ton) ..—s. to —s.
 Mustard (per bushel) white 6s. to 7s.; .. brown, 8s. to 10s.
 Coriander (per cwt.) ..—s. to —s.
 Canary (per qr.) ..—s. to —s.
 Tares, Winter, per bush., 5s. 0d. to 5s. 6d.; Spring, nominal.
 Caraway (per cwt.) ..—s. to —s.
 Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.
 Cloverseed, nominal.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. .. 24s. to 42s.
 Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton) ..—s. to —s.
 Rape Cake (per ton) ..—s. to —s.
 Hempseed, small, (per qr.) 32s. to 33s.; Do. Dutch, 34s. to 36s.
 Tares, (per qr.) ..—s. to —s.
 Rye Grass (per qr.) ..—s. to —s.
 Coriander (per cwt) ..—s. to —s.

BOROUGH HOP MARKET.

FRIDAY, Sept. 27.

Our market is somewhat extensively supplied with new Hops, both from Sussex and Kent, in excellent condition. The plantation accounts at hand this morning state that the produce is turning out large, though not of heavy weight. Rather an extensive business is doing, on the following terms:—

New Weald of Kent pockets 75s. to 86s. per cwt.
 Sussex ditto .. 65s. to 75s. ..

The above are factors' prices, consequently for ready-money. A few parcels of East Kent Hops have arrived, and sold at from 90s. to 120s. per cwt. The Duty is called £215,000 to £220,000.

POTATO MARKET.

BOROUGH AND SPITALFIELDS, Friday, Sept. 27.

During the present week the arrivals of Potatoes have been comparatively small, but fully adequate to meet the wants of the dealers. Selected qualities are in better

request at full prices. In all other kinds exceedingly little business is doing.

BOROUGH.

Kent and Essex Ware, per ton ..	50s. to 70s.
Kent and Essex Middling	30s. to 45s.
Chats	25s. to 30s.

SPITALFIELDS.

Kent and Essex Shaws, per ton..	50s. to 70s.
Kent and Essex Regents	50s. to 70s.
Middling Ware.....	30s. to 45s.
Chats.....	25s. to 30s.

ENGLISH BUTTER MARKET.

MONDAY, Sept. 23.

Our market is without change; and no improved sale upon stale parcels can be looked for until cold weather comes.

Dorset, fine weekly.....	80s. to 82s. per cwt.
Ditto stale and inferior	60s. to 70s.
Devon	64s. to 70s.

Fresh, 8s. to 10s. 6d. per doz. lbs.

BELFAST, (Friday last).—Butter: Shipping price, 68s. to 76s. per cwt.; firkins and crocks, 7d. to 8d. per lb.; Bacon 36s. to 40s.; Hams, prime, 64s. to 68s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 60s. to 62s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 42s. to 46s.; kegs or firkins, 40s. to 41s. per cwt.

Sept.	Butter, per cwt.	Bacon, per cwt.	Dried Ham, per cwt.	Mess Pork, per brl.	Cork per lb.
19.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.
1846	95 0 97 0	55 0 57 0	66 0 74 0	65 0 67 0	67 0
1847	92 0 93 0	64 0 72 0	75 0 82 0	77 0 80 0	80 0
1848	72 0 80 0	60 0 64 0	66 0 82 0	80 0 82 0	82 0
1849	60 0 66 0	48 0 50 0	68 0 75 0	76 0 78 0	78 0
1850	64 0 70 0	37 0 42 0	65 0 70 0	69 0 62 0	62 0

PROVISION MARKET.

FRIDAY, SEPT. 27.

Owing to the limited stock on hand and the small arrivals, the demand for Irish Butter is active at an advance in the quotations of from 3s. to 4s. per cwt. Carlow, 74s. to 80s.; Clonmel, 78s. to 80s.; Limerick, 74s. to 78s.; Sligo, 70s. to 74s.; and Cork, 80s. per cwt. landed. For shipment, Corks have sold at 80s., and Limericks 72s. to 75s. on board.

English Butter is in good request, at fully last week's prices. Prime weekly Dorset, 78s. to 82s.; inferior, 56s. to 70s.; Devon, 60s. to 70s. per cwt.; fresh, 8s. to 10s. per dozen lbs.

We have a good inquiry for foreign Butter at 3s. to 4s. per cwt. more money.

Very little Bacon is on offer. Prime sizeable Waterford is quoted at 56s. to 58s.; Belfast tierces, 48s. to 50s.; and Hambro', 52s. to 56s. per cwt.

Lard moves off freely. Waterford bladdered, 50s. to 52s.; firkins and kegs, 38s. to 46s. per cwt.

India Pork is quoted at £5 5s. to £5 7s. 6d. per tierce; and mess, 60s. to 62s. 6d. per brl.

HAY MARKETS.

THURSDAY, September 26.

The general demand ruled inactive to-day, at about stationary prices.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechapel.
Meadow Hay.....	56s. to 76s.	50s. to 78s.	50s. to 74s.
Clover, do.	70s. 86s.	65s. 84s.	70s. 85s.
Straw.....	23s. 28s.	24s. 30s.	23s. 28s.

FLAX.

BELFAST, (Friday last).—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

WOOL MARKETS.

FRIDAY, Sept. 27.

The change in the wind has brought up a large fleet of vessels from the westward this week. The imports of Wool have therefore been very extensive, viz., 269 bales from Algiers, 291 from Gibraltar, 8 from Naples, 231 from Bombay, 206 from Adelaide, 16 from Constantinople, 1,380 from Melbourne, 171 from the Cape, 615 from Hobart Town, 62 from Hambro, 605 from Geelong, 1,953 from Algoa Bay, 515 from Port Beaufort, 1,073 from Sydney, and 13 from Jamaica. Although a large addition has been thus made to the stocks in warehouse, a steady business is doing in the private contract market, at very full prices.

BARK.

Per load of 45 cwt.

English, Tree	£13 0 0 to £14 0 0
Coppice.....	14 0 0 16 0 0

HIDE AND SKIN MARKETS.

Market Hides,	56 to 64lbs.....	s. d.	s. d.	per lb.
Do.	64 72lbs.....	0 1½	0 1½	"
Do.	72 80lbs.....	0 2½	0 2½	"
Do.	80 88lbs.....	0 2½	0 3	"
Do.	88 96lbs.....	0 3	0 3½	"
Do.	96 104lbs.....	0 3½	0 3½	"
Do.	104 112lbs.....	0 4	0 0	"
Calf Skins, light	2 6	3 0	each.	
Do. full	5 0	0 0	"	
Polled Sheep	2 4	3 2	"	
Half-breds	2 2	2 8	"	
Downs	2 0	2 5	"	

MANURES.

LONDON SEPTEMBER 23.

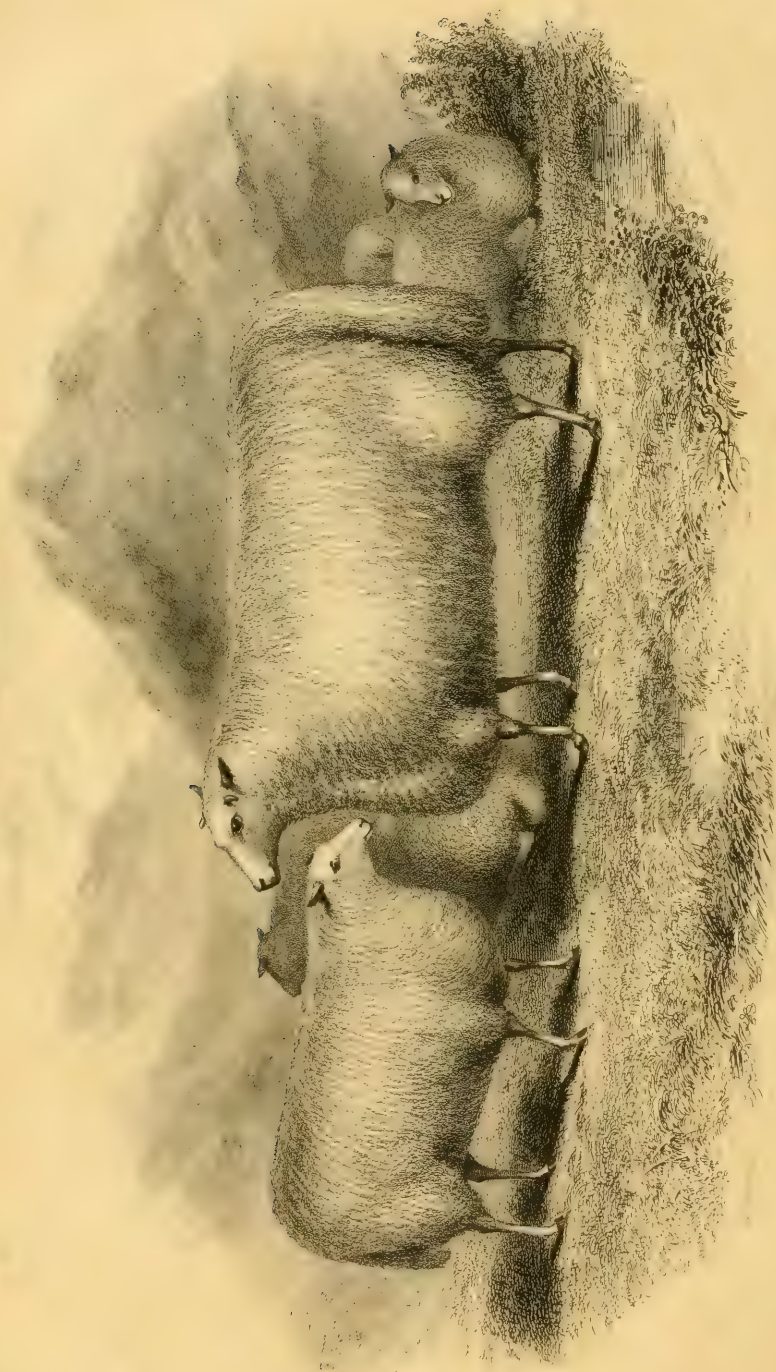
Manures steady as last week.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL Cakes, &c.

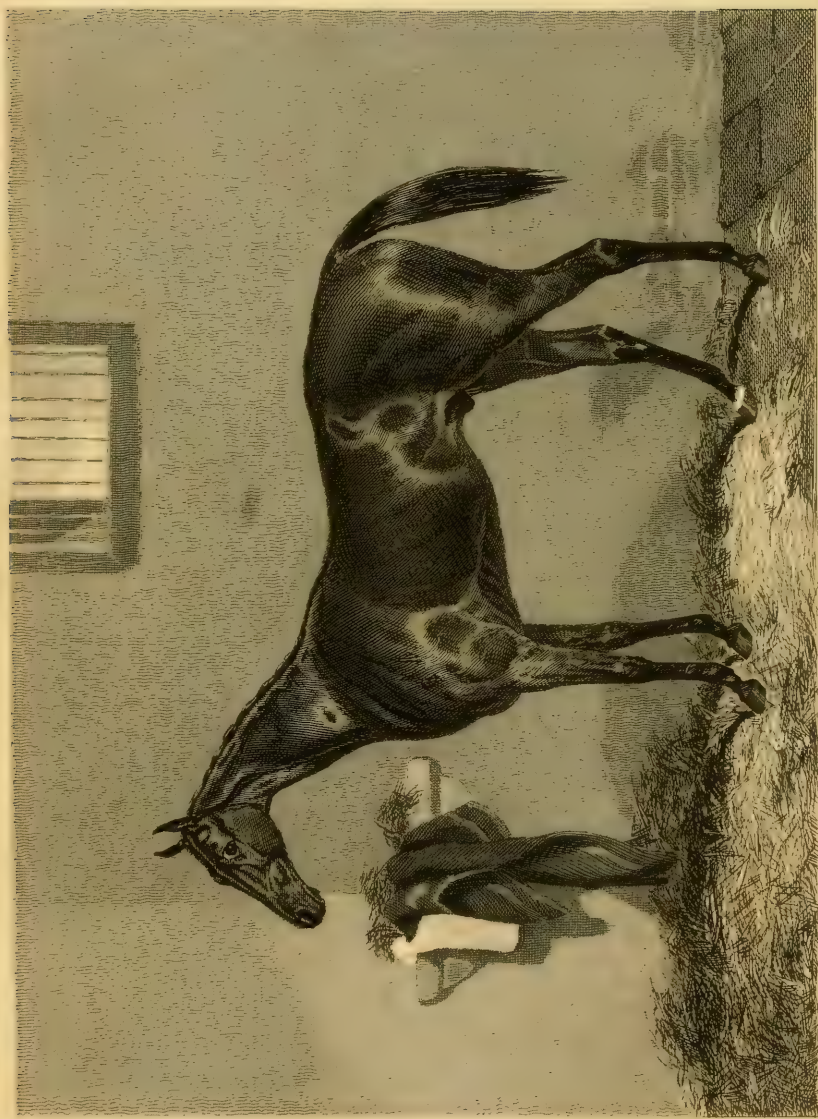
Guano, Peruvian	per ton	£0 0 0 to £9 5 0
" In quantities under 5 tons ..	"	0 0 0 to 9 10 0
Potter's Guano	"	0 0 0 to 7 0 0
Nitrate Soda	"	14 0 0 to 14 5 0
Nitrate Potash or Saltpetre	"	26 0 0 to 28 0 0
Superphosphate of Lime	"	0 0 0 to 6 6 0
Soda, Ash or Alkali	"	0 0 0 to 9 0 0
Gypsum	"	1 10 0 to 1 15 0
Coprolite	"	3 0 0 to 3 5 0
Sulphate of Copper or Roman Vitriol for Wheat steeping.....	"	27 0 0 to 29 0 0
Salt	"	0 0 0 to 1 5 0
Bones, 3 inch	per qr.	0 0 0 to 0 15 0
" Dust	"	0 0 0 to 0 17 0
Oil Vitriol, concentrated.....	per lb.	0 0 0 to 0 0 1
" Brown	"	0 0 0 to 0 0 ½
Rape Cakes.....	per ton	4 5 0 to 4 10 0
Lined Cakes.....	"	"
Thin American in barrels or bags ..	"	8 0 0 to 8 5 0
Thick ditto round.....	none	0 0 0 to 0 0 0
Marseilles	"	7 10 0 to 7 15 0
English	"	7 5 0 to 7 10 0

TIMBER.

	£ s. d.	£ s. d.
Baltic Timber, per load of 50 cubic feet..	2 15 0	to 3 10 0
Yw. Deals, per standard hundred ..	10 10 0	to 15 10 0
Deck Deals, per 49 feet 3 in.	0 15 0	to 1 0 0
Pipe Staves, per mille	105 0 0	to 125 0 0
Lathwood, per fm. of 6 feet	8 10 0	to 9 10 0
Petersburgh, Riga, and Archangel ...	12 0 0	to 15 0 0
Yw. Deals, per stand. hundred ..	9 0 0	to 10 0 0
White.....	12 0 0	to 14 0 0
Yw. Battens	2 10 0	to 3 10 0
Riga Logs, for 18 feet cube	100 0 0	to 150 0 0
Stettin Staves, per mille of pipe.....	2 12 6	to 2 17 6
Swedish Timber, per load	17 0 0	to 22 0 0
Gothenb. Yw. Deals, per 100 12ft. 3in. 9in..	15 0 0	to 18 0 0
White ditto	11 0 0	to 14 0 0
Yw. Battens, per hd. 12 ft. 2½ in. 7 in. 11	23 0 0	to 24 0 0
Christiania Yw. Deals, per hd. 12ft. 3in. 9in.	20 0 0	to 21 0 0
White ditto	13 0 0	to 16 0 0
Quebec and St. John's Spruce Deals..	12 0 0	to 16 0 0
per 100, 12 ft. 3 in. 9in.	"	"
1st qual. yw. Pine Deals, per st. hd.	"	"



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THE FARMER'S MAGAZINE.

NOVEMBER, 1850.

No. 5.—VOL. XXII.]

[SECOND SERIES.

PLATE I. CHEVIOT RAM AND EWES.

The property of Mr. James Brydon, of Moodlaw, Langholm, which obtained prizes at the Highland Society's Meeting, held at Edinburgh, in August, 1848.

PLATE II.

VOLTIGEUR; WINNER OF THE DERBY AND OF THE ST. LEGER, 1850.

Voltigeur, bred by Mr. R. Stephenson, of Hart, in 1847, was got by Voltaire out of Martha Lynn, by Mulatto, her dam Leda, by Filho da Puta—Treasure by Camillus.

Voltaire, also bred by Mr. R. Stephenson, in 1826, and by Blacklock, dam by Phantom, was a very good racehorse, having won five out of his six appearances, including the Doncaster Cup. He is yet better known as a stud-horse, being the sire of upwards of seventy winners, and his stock generally very grand, fine specimens of the English thorough-bred horse; they number, amongst others, Henriade, Picaroon, Slashing Harry, Harpurhey, Cowboy, Lady Mary, The Dean, Charles XII., Yorkshire Lady, Thirsk, Semiseria, Prussic Acid, Executor, and Black Eagle—Voltigeur, however, being his first Derby winner.

Martha Lynn, bred by Mr. Sharpe, in 1837, ran at two and three years old under the late Mr. Ramsey of Barton's colours, and with very fair success. She was put to the stud in 1842, but out of five produce has yet thrown nothing save "this one" to add to her renown.

Voltigeur, a brown horse with no white about him beyond a little in the off hind foot, stands fifteen hands three inches high; he has a somewhat coarse head, small ears, strong muscular neck, and fine oblique shoulders, with very good depth of girth; he has a rather light middle, but good back, with powerful quarters drooping towards the tail, muscular thighs, and good hocks and knees, with plenty of bone. He stands perhaps a little high on the leg, though altogether a very useful if not a very showy-looking horse, with a docile quiet temper and excellent action.

SUMMARY OF VOLTIGEUR'S PERFORMANCES.

In 1849 he started once and won once—		
The Wright Stakes, at Richmond.....	Value clear	£60
In 1850 he started three times and won three times—		
The Derby Stakes, at Epsom		5,550
The St. Leger Stakes, at Doncaster		2,125
The Cup, at Doncaster		300
		£8,035

Lord Zetland, the owner of Voltigeur, has been on the turf in a small way for the last ten or twelve years. We find the spotted jacket registered in the Colour List of the Calendar in 1841, but the few horses his lordship has brought out until very lately did but little for "the owner's name," as the card-sellers have it, even on the Richmond and Northallerton circuit, to which their performances were generally confined. Within this season or two, however, there has been a decided improvement in their quality; and Ellen Middleton, Cantab, and others, mildly prefaced the way for the Derby winner and very best horse of his day.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. VII.

When these articles were first contemplated, I was actuated by the desire to instruct those who intended to lead a country life, how to do so not only without loss, but with pleasure and profit to themselves. I therefore proposed to recite faithfully the results of my own experience, dealing very little with theory, but appealing to it occasionally when it might be supported by practical evidence. But latterly a widely extended object has presented itself, in consequence of the altered state of society. Emigration is the order of the day; but it becomes more and more evident that every person who emigrates should be qualified to enter upon the duties of a thoroughly rural life; otherwise the risk he will incur while purchasing his experience must be distressingly serious. Under circumstances wherein a man is driven to rely upon his own resources, what advantages would he not derive from a practical knowledge of all the operations of culinary gardening, and the rearing of domestic animals! He that can put forth his own bodily strength, and employ his mental energy in performing and in instructing his children and dependents in all the duties of domestic economy, could not fail, humanly speaking, to prosper.

Conformably with the enlarged object now in view, it will be necessary to begin with the first principles of cultivation, which since the ample discoveries that have resulted from the analyses of Professor Way, Consulting Chemist to the Royal Agricultural Society, have been certified beyond question or doubt. In the first place, however, referring the reader to the two invaluable articles "On the Absorbent Power of Soils," in No. 25 of that society's *Journal*—one by Mr. Thompson, pp. 68 to 74, the other by Mr. Way, pp. 313-379, I must observe that the general principles now to be laid down as the basis of a sound theory of cultivation are founded absolutely upon direct experimental facts, established by analyses of earths and liquid manures since the end of last August; partly, however, with a view to confirm or repudiate the results of a trial made almost twenty years ago, with an exceedingly foul liquid that had been poured over the soil of a plant growing in what gardeners call a 48 or 36 size garden-pot. It was then seen that all the feculences had been arrested, and the colouring matter and fœtor destroyed; for the water which percolated the soil, and passed

through the orifice of the pot, was limpid, comparatively bright, and free from any offensive smell. Similar experiments were doubtless performed by many with a view to ascertain the effects produced by liquid manures upon plants growing in pots, but wholly irrespective of any reciprocally chemical agency exerted between the soil and the manure. Now, however, a grander and far more important object presents itself; and this embraces not only the absorbent power of soil, by which it fixes and retains to the point of saturation all the ammoniacal and chief nutritive principles of manures, fluid or solid; but it causes to pass downward, and thus to expel, those cretaceous substances which constitute hard water. My own experiments, conducted upon plain principles, and with instruments and tests very simple, and little expensive, are decisive in their results: and they all confirm Mr. Way's luminous and elaborate statements, to which I would direct the chemical reader's serious attention, and particularly in the present instance to the Experiments No. 92 and 93, on "Putrid Urine," *Royal Agricultural Journal*, page 364.

To sum up in a few lines, and thus at a glance to make the reader aware of the immense advantages that must be derived from the discoveries already effected, we observe, first, that the land must in a greater or less degree contain some loam—which term implies the presence of clay, and with it, in close union, a portion of chalk, though perhaps so combined as not to be traceable by any of the ordinary processes of analysis. Second, sands or sandy heath-soils, void of any loamy ingredient, are not calculated to attract or retain manures to any available extent: hence they are aptly called hungry soils, and cannot bring to perfection the more valuable crops of either the farm or garden, unless we except the potato, which requires meanness in the lighter varieties of earth. Third, loamy soils absorb by preference ammonia, whether it be applied in its pure and caustic state, or as a mild carbonate; or when combined with sulphuric, nitric, or muriatic acid, as a neutral salt: in the latter case attracting and fixing the ammoniacal base, and liberating the acid, which then, by a specific natural energy, searches out and combines with so much of the chalk as it requires to form a neutral sulphate, nitrate, or muriate of lime (any or all of these) as the case may be.

Fourth, the above salt or salts of lime are carried down through the soil, as a clear watery solution, hard in quality, as may be proved by adding to it a few drops of spirituous solution of soap, which it curdles without producing a soft lather. Fifth, the leading chemical facts which apply equally to agriculture and gardening, instruct us that deep tillage is required wherever the subsoil admits of it, in order to prepare a bed capable to receive, and permanently retain, that quantity of manure which various plants require: and this deep tillage implies a corresponding system of drainage to convey and carry off the volume of hard chalky water that a generous system of manuring is sure to separate and propel downward. Finally, I think that the absorbent power of loamy soils, including, as it does, the expulsion of lime in solution, affords indirectly a key to the puzzling question of "liming," and to this subject Professor Way has alluded, in his closing paragraph, at page 379.

I have already on several occasions offered some remarks on the affinity which lime possesses in a pre-eminent degree for all those products of vegetable decay called humus and humic acid. Mr. Rowlandson, of Liverpool, wrote an able paper thereon about seven years since, from which I was led to a course of experiments which fully substantiated his statement, and demonstrated that whenever land is glutted with vegetable matter, lime is the sole, but all-sufficient corrector. Thus, if the black drainage of a dunghill, or any brown liquid manure, be treated with strong lime-water, or a few drops of cream of lime, the colouring humus matter will be attracted, fixed, and carried down as dingy flocks of insoluble humate of lime. Let the reader who is interested in such inquiries

bring the fact to the most rigid tests! If then lime combines with and renders innocuous redundant humic acid, land which is deficient in humus matter (i. e., vegetable and animal mould) will receive no benefit chemically from its abundant application.

From what has been stated, it will appear that experiments have been chiefly conducted with liquid manures of various descriptions. Convenience has here been consulted, for thus the filtration through soils could be easily observed, and speedily accomplished; but the results are *bonâ fide* the same when solid manures are incorporated with the soil. The chemical laws are equally obeyed in this case, and perhaps with less danger to any first crop of a routine course. Many farmers have entertained and advanced the opinion that farm-yard dung first parcelled-out in heaps, and then spread over the surface, there to remain for a considerable time before being ploughed-in, produces the most beneficial effects. So far as the rain which falls on manure thus exposed carries down the soluble humates of ammonia and of the fixed alkalies, immediate enrichment of the land will be produced in obedience to the law of absorption; but loss and waste by evaporation must be admitted. Deep tillage, with the deposition of fermenting manure at a corresponding depth, lays the foundation for permanent fertility; and thus provision will be made for the most ample yield of those green crops, whether of field or garden, which are devoted to the stall or sty, and consequently for the production of those animal excretions which, after everything that has been and can be said, are the best and most natural of all fertilizers.

THE MANURE OF THE PIG.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

The extended keeping of swine has in many districts been one of the improved practices of modern farmers. To this several causes have contributed; their breed has been improved through the efforts of Mr. Fisher Hobbs, and other benefactors of agriculture—their management has been better understood. They were formerly a neglected and ill-understood animal. It is curious to notice how the English farmers of the year 1641 regarded them; writing about that time, quaint old Gervas Markham thus spoke of the pig:—

"Although swine are accounted troublesome, noisome, unruly, and greatly ravenous, as indeed their natures are not much differing from such qualities; yet the utility and profit of them will

easily wipe off those offences, for to speak truly of the swine, he is the husbandman's best scavenger, and the housewife's best sink, for his food and living is by that which will else rot in the yard, make it beastly, and make no good manure, with which he will live and keep a good state of body very sufficiently; and though he is accounted good in no place but the dish only, yet there he is so good and so lovely that all other faults may be borne with" (*Way to Wealth*, p. 100).

The habits of the pig, however, are not exactly what is commonly understood. There is no animal more benefitted by cleanliness and attention—he delights in quietude and comfort, dislikes noises, storms, and even unruly winds. In his selection of

vegetable food he is more nice than all other domestic animals, and as the editor of the *Quarterly Journal of Agriculture* remarks, if the following table is to be depended upon, it would lead to very curious conclusions.

It has been calculated that—

The Cow eats 276 plants, and rejects	218
„ Goat „ 449	126
„ Sheep „ 387	141
„ Horse „ 262	212
„ Hog „ 72	271

Some excellent brief rules for the profitable management of swine have recently been communicated by Mr. Hewitt Davis, who long possessed a very extensive and profitably managed stock of them, at Spring Park. He remarks, in his usual terse way :—

“My experience in stock keeping has been so decidedly in favour of breeding and fattening of pigs, that I may, with advantage to many who think differently, give some account of my management. That I should do so is the more necessary from farmers having generally a very low opinion of the profit to be gained from breeding of pigs, and I cannot but ascribe their failures too often to the negligence with which this stock is looked after. On an arable farm of 200 acres my stock has been 12 sows and two boars, and their produce, according to the season, consisted either of rising stores running in the yards, or on the leas or stubbles; or of porkers in the sties fattening for the market. From March to October my stock may be said to have lived loose on store keep, principally green food; and from October to March (the parent stock excepted) in sties, fattening on roots and boiled corn. The sows on an average gave me, one with another, 14 pigs a-year each, so that in summer my stock was about 100 upon store keep, and in winter about 200, of which 180 were in sties finishing for market. The spring litters went off in January and February as large porkers of 30 stones each, and the autumn born as small porkers of about 7 stones each; the first realising about £5 each, and the last about 30s. each, so that each sow returned about £45 a-year, and this amount there is no difficulty in obtaining, large pork selling at 3s. 4d. per stone of 8lbs., and small pork at 4s. 4d. Success in raising of pig stock I found was to be attained only by attention to fully carrying out the following principles—viz., the accommodation for pigs must be sunny, dry, sheltered from cold wind, and yet well ventilated. Their sties being carefully protected on the north, east, and west side, and open only on the south; so that whilst no cold winds can have access, there should be no obstruction to the sun shining in and on to their beds. The pigs

must be regularly and carefully attended; sufficient should be kept to wholly occupy their attendant's time, and to them should that attendant's time and attention be wholly given. An old man is better than a young one; and this is an office suited to one infirm or past general labour. The sows must never be permitted to farrow earlier than the end of March, or later than October. The cold of winter is fatal to many furrows, and young pigs are ill able to bear up against it. Provide roots (potatoes, kohl rabi, swedes, carrots, and mangold wurzel) for their keep, aided with boiled corn, from September to June; and tares, clover, beans, and maize, green, from May to September. Breed from large strong sows with boars of the finer breed, having in view the gaining of large farrows, good nursing, and a rapid attainment of weight; look to the mother for nursing, and the father to correct coarseness of form in the mother. Attached to the sties have a boiling-house with copper and food cisterns; and in front of the sties a yard for the pigs to be turned into. Attention to these points makes all the difference between profit and loss.”

There have been several comparative experiments reported, which well support the asserted advantages of cleanliness and feeding the pig with cooked food.

Mr. J. H. Fennel (*Quar. Jour.*, 1846, p. 376) gives the result of an experiment upon the effect of cleanliness in feeding six pigs of nearly equal weight on the same food and litter, for seven weeks. “Three of the lot were kept as clean as possible with a curry comb and brush, and were found to consume in seven weeks fewer peas by 5 bushels than the other three, yet weighed more when killed by 2 stones and 4 lbs. upon the average.

And as regards the practice of steaming their food, we find: “From Mr. Boswell's experiments (*T. H. S.*, vol. x.) that during an equal space of time the increase in the live weight of five pigs, fed on steam-boiled food, was 4 cwt. 2 qrs. 7 lbs., at an expense of £6 19s. 4d., while the increase in the live weight of five pigs, fed on raw food, was only 2 cwt. 2 qrs. 21 lbs., at an expense of £5 8s. 6d., a result highly favourable to the practice of feeding swine on steamed food.”

I have been rather led away, however, by these important practical remarks, from the intended theme of this paper—let us then proceed to the examination of the excretæ of this valuable animal.

The relative value of the manure of the pig to other animal manures has been viewed in several ways; like that of all other animals it of course varies in quality with the food on which the animal is fed—when fed on corn or animal matters it must of necessity be rich. If the question is viewed in connection with the proportion of nitrogen which it contains, then its value stands high on the scale.

This was the plan adopted by M. Boussingault, the celebrated French farmer; he published a table indicating the quantity of each kind of manure required to replace 100 parts of good farm-yard manure, from which he concludes that to produce the same effect there must be used (*Quar. Jour. Agri.*, 1848, p. 377)—

18½ parts of the excrements of the goat.	
36 do. sheep.	
54 do. horse, and urine mixed.	
63½ do. do. of the pig.	
73 do. of the solid excrements of the horse.	
97½ do. of the mixed excrements of the cow.	
125 do. of the solid do.	

The urine of domestic animals, according to their greatest riches, may, according to M. Girardin, be thus classed:—

	Solid matter.	Azotized matter.	Saline matter.
Of the Horse	Ox	Horse	
Ox	Man	Cow	
Cow	Horse	Ox	
Man	Cow	Pig	
Pig	Goat	Man	
Goat	Pig	Goat.	

The effect of different manures in promoting the vegetation of barley was long since tested by Mr. Wright (*Agri. Mag.*, vol i., p. 328). The experiment was made on plots of ground of equal size, and each plot was dibbled with 60 corns of barley—the result was as follows:—

The soil simple produced of stems of barley..	159
The soil manured with, per acre—	
5 tons of sheep dung	244
5 „ of pig dung	233
5 „ of horse dung	226
5 „ of cow dung	167

The dung of the pig, like that of the horse, the ox, and the sheep, has a considerable attraction for the moisture of the atmosphere. I found that where 1000 parts of horse dung previously dried in a temperature of 100° was exposed for three hours to air saturated with moisture, of the temperature of 62°, there were absorbed of moisture..... 145 parts

1000 parts of cow dung under the same circumstances, absorbed	130 „
1000 parts pig dung	120 „
1000 parts sheep dung	81 „

The use of the pig in the production of manure is not confined to the powerful nature of its own excrete; its labours in the farm-yard in search of food; tend to mix the manure of different animals, in a way which materially promotes the value of the entire manure of the farm-yard. This advantage of mixing manure, and of keeping pigs in farm-yards, has been alluded to by several farmers.

Mr. Francis Blakie, of Holkham, in his valuable little tract upon the management of farm-yard manure, dwells upon several of these; he particularly condemns the practice “of keeping the dung, arising from different descriptions of animals, in separate heaps or departments, and applying them to the land without intermixture. It is customary,” he adds, “to keep the fattening neat cattle in yards, by themselves; and the manure thus produced is of good quality, because the excrement of such cattle is richer than that of lean ones. Fattening cattle are fed with oil-cake, corn, Swedish turnips, or some other rich food; and the refuse and waste of such food, thrown about the yard, increase the value of the manure; it also attracts the pigs to the yard. These rout the straw and dung about, in search of grains of corn, bits of Swedish turnips, and other food: by which means the manure in the yard becomes more intimately mixed, and is proportionately increased in value. The feeding troughs and cribs in the yard should, for obvious reasons, be shifted frequently.”

In considering then the advantages of pig feeding, the value of the manure it produces must be carefully taken into the account. It is a manure which is in some districts deemed “a hot,” in others “a cold manure.” It is excellent for the dressing of orchards, and the growth of celery, and some other culinary vegetables; and there is little doubt that as produced by the fatting pig, it is as powerful a dressing as any of the animal manures with which the farm-yard is furnished.

ON THE THEORY AND PRACTICE OF CLAY-LAND DRAINAGE.

BY M. M. M.

The object of all drainage is to so free the soil from superabundant water, as to enable it to hold in suspension, and by its capillary attraction, just as much as will enable it to afford proper nutrition and moisture to plants, and no more than their wants require; and on strong clays this ideal state

of things is produced by the facility they possess, when properly drained, of taking away at once all the water which may fall on their surface when perfectly level; and a degree of absorption less than this on such soils, is inadequate to produce the effects of proper drainage. How deep on each particular

class of soils it is required to effect just this object, and how wide? are questions which are by no means settled; for until we can fully state the precise effects of any particular depth of drain, or width between the drains, we shall never be able to lay down any general rule.

In the unhappy discussion at Newcastle, between the late James Smith, of Deanston, and Mr. Parkes—unhappy because it was by far too much a discussion of theoretical principles and party spirit; and more as to whether the deep draining Smith of 1830, or the deeper draining Parkes of 1840, were right. In this an attempt was made to show the superiority of deep over shallower drainage, by a mathematical diagram, drawn on the wall by a chalk, and which has not, that we are aware of, been even accurately recorded. On its face, it bears the stamp that its teaching must be correct; hydraulics and mathematics are brought to bear upon the point in a most remarkable way; and it seems, as it did then, even now, to be unanswerable; and theoretically it must be so. Figure A is made to indicate the shallow, and figure B the deep drains.

FIG. A.

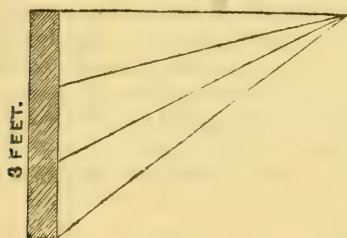
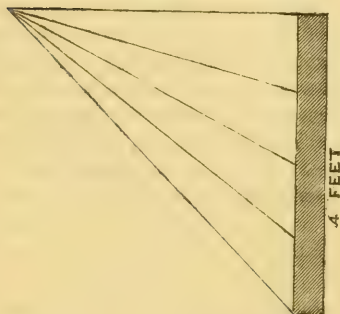


FIG. B.



Mr. George Darling, in the discussion, as we intimated, satisfied himself with drawing two diagrams similar to those noted above; and on being called upon for an explanation, the matter was taken up by H. S. Thompson, Esq., who declared that the diagram explained itself. If the soil was in a condition to allow its being penetrated by the rain, and the water descended in a vertical direction, it

would descend to a depth of three feet or more as soon as it would descend one foot; but when it came to the bottom to which it can descend vertically, it has then to send its way sideways; then it was that the water made slow progress. If the direction was solely vertical the water would, from superambient pressure being greater, find its way sooner to a depth of three feet than of one foot.

The real truth, however, is, that there is a depth peculiar and proper for the different kinds of clay; for these remarks if true, would be true not for 3 or 4 feet, but for 8 or 10, or any other number of feet, which we know is not the case; so that how true soever general principles may be, how near soever they may come to the perfection of theoretic science, the modification of natural laws will so far interfere as to render them only partially applicable.

Some of the most talented and stern of the deep drainers are beginning to give way. Thus one of the most successful of the opponents of an uniform depth, either great or small, is Mr. W. B. Webster. Amongst the most recent attacks on that gentleman's theory—one which rejects the deep drainage of *all* clay lands indiscriminately—is the Right Hon. C. Arbuthnot, who declares the complete success of his own draining of tenacious clay four feet deep, and stating that the bailiff of the Duke of Wellington had decided on draining never less than four feet on the most stubborn soils. Presently comes forward Mr. Webster, armed with a letter from Mr. Easton, the duke's steward referred to, who states that the 3 feet drain, 26 to 30 feet apart, answers best;—that in one instance he adopted the 4 feet deep drains; but he found it necessary to place 3 feet drains between each of these, and decided that he would never put in a drain on heavy clay more than three feet deep for the future.

Well says Mr. Pusey, the editor of the Society's Transactions, "It must now be regarded, not as a wholesome assertion, but as an established fact, that there are certain clay formations in the south of England in which deep drainage is not unlikely to fail. In porous subsoils drains can hardly be too deep; and, as I have said before, will sometimes if cut round or through a field, lay it dry without any under-draining at all, exhausting wells a quarter of a mile distant" (p. 312). Mr. J. H. Charnock, the Drainage Commissioner, who has had great experience, arrives at a similar conclusion, and with equal accuracy—"That there is no mode of drainage equally applicable and effective on all soils, may now be considered as a settled truth." Indeed if it were not so, if a three or four or five feet depth were always to be depended upon, the science of practical drainage would be within the reach of every tyro, and instead of the fearful waste of money too often witnessed, there would be no necessity

for applying to the drainage inspector or agricultural engineer, but at once to apply a blind rule to all kinds of cases. Now if we witness the experiments of that careful observer, D. Milne, Esq., of Milnegraden, and contrast these with other experiments in the same county, we have the following results :—

1. Sandy oats, 3 feet by 15 feet drains, had less bushels per acre than $3\frac{1}{2}$ feet by 30 feet drains, by $19\frac{3}{4}$.
2. Black oats, 3 feet by 15 feet drains, had less bushels per acre than $3\frac{1}{2}$ feet by 30 feet drains, by 22.

Whereas the same gentleman mentions the experiment of another valuable authority in agricultural matters, Mr. Hope, of Fenton Barns, who had of oats and wheat as follows—

	Oats.			Wheat.		
	qrs.	bu.	pks.	qrs.	b.	
On 3 feet drains by 18 feet	10	0	0	..	5	$6\frac{1}{2}$
On 1 foot 8 inch drains by 18 feet	12	1	2	..	6	4
On 3 feet drains by 36 feet	9	4	2	..	6	0
Undrained land	9	0	0	..	6	0

4. On turnips the same peculiarity occurs, and these experiments are very striking because they refer to depths out of the range of the present controversy, indeed to depths supposed to be utterly unsafe, and repudiated by all parties.

	Tns.	Cwt.
On 3 feet drains by 18 feet	21	8
On 1 foot 8 inch drains by 18 feet	24	6
On 3 feet drains by 36 feet	20	14
Undrained land	21	18

Nay, this would go even beyond, and show that the drainage of the land at 3 feet deep and 36 feet apart, did absolute injury to the soil: this could not be, under any circumstances whatever. The probability, however, was that no part of the soil had any great necessity for drainage at the very outset, and hence it is not the most favourable to select for a fair experiment on the merits of the drainage question—yet still as a fact it is sufficiently curious.

It is impossible to deny the influence of the atmosphere on the soil to a very great degree, and especially to the clay soil, which of all others seems to be the most improved, and rendered fit for a receptacle for plants, by a complete and thorough passage of the air of the atmosphere through it. The most tenacious soil, after a good fallow, in other words after large square portions of the soil are thoroughly dried through—all the water expelled, we mean—and so the interstices thoroughly charged with oxygen; becomes productive and friable, and fit to grow crops of corn. A soil charged with water is, so far, an excluder of the oxygen of the at-

mosphere, and causes the failure of seeds, slow and imperfect as well as uneven germination; and the antiseptic power of this water prevents the decomposition of the particles of the soil of an organic character, and the disintegration of those of a mineral description.

Let it be remembered that it was the oxygen and the frost which first broke down the parent rock into soil; and it must be the same agency which must disintegrate and fit the soil for the reception of the spongioles of the delicate plants which have to feed on its resources. The presence of the atmosphere alone will enable the oxygen to find its way through a soil, if the excessive moisture only be abstracted; but schemes have been elaborated and devised with no little care and attention, to create an absolute circulation of air through the soil by means of drainage, so as to make the drains serve the double purpose of freeing the soil from superabundant moisture on the one hand, and for supplying it with a large amount of air by a circulating draught on the other.

One of the most prominent advocates of the air drainage system is Mr. Simon Hutchinson, of Manthorpe Lodge, near Grantham, who has by pamphlets and other publications strongly urged the aëration of soils by means of drains cut expressly for the purpose; a system of which he claims the authorship, and we believe rightly, having recommended it to the tenants of Lord Brownlow as long ago as 1846.

In order to experiment upon his plan he selected a field previously shallow drained, which the owner had drained with tiles three years before, the depth of the drains being 24 inches, and the distance between them 15 feet; the whole being parallel drains, and discharging into a covered outfall at the lowest part of the field. In this field he selected ten drains, and to five of each he made a uniting drain, so that the five drains were all connected with a cross drain, and this he connected with the open ditch which ran on the top of the field. He had thus ten drains, of the twenty-five of which the field consisted, in two different parts of the field, with a double connexion with the atmosphere, viz., at the heads with the open ditch, and at the bottom with the outfall of the main drain. He thus, he contended, established a current of air through two compartments of the field, and in the subsequent year he found the soil present a much improved appearance under which the ten air-drains were running; and the plough which was then crossing the field left signs of plastering on the parts of the field drained in the ordinary way, but showed perfect freedom from it on the parts where the air drains had been adopted—so much for the effects in wet weather. In a dry season which for

lowed, the air-drained land had turnips, said to be 50 per cent. better than on the rest of the field. Wheat followed the turnips, and this again on the air-drained portions exhibited a great improvement over that on the ordinary drained land. The scales however, were applied to the crops in large proportions of the wheat and turnips, the result was thus given:—

<i>Turnips.</i>	Skirving's. Pine-apple.			
	Tns. cwt.		Tns. cwt.	
Air-drained land..	16	4	10	8
Ordinary drained	13	12	6	16
Difference per acre	2	12	3	12

<i>Wheat.</i>	Grain.		Straw.	
	bu.	pks.	cwt. qrs.	lbs.
Air-drained land..	35	0	35	3 6
Ordinary drained	29	3	30	0 10
Difference per acre	5	1	5	3 6

The deductions drawn from these experiments by Mr. Hutchinson are, that though land may be drained at an inefficient depth, yet that drains two feet deep and five yards apart, with air-drains, are equal to drains two feet six inches deep without them; and he thus intimates that even inefficiently drained lands may be much improved by adopting this principle, instead of taking them up, and thus preventing a great waste of capital by the labour of removing and replacing the shallow drains by deeper.

Now though we are by no means disposed to doubt in any way, nor to cast the slightest degree of discredit on the experiments given by Mr. Hutchinson, we should be glad if he would repeat them under other circumstances, for it is hardly ever safe to adopt an hypothesis on one experiment. Indeed, whatever may have been the cause of the ploughing on the ordinarily drained land being of a shining or plastering character, this would be quite sufficient to account for the subsequent deficiency both of the turnips and the wheat; and it must be remembered that as much of the land in the field as was not occupied by the air-drained parts was that by the hedge sides, which generally, from one cause or another, produce lighter crops, we must, it must be confessed, make proper allowances for this circumstance.

We are by no means disposed to assert that no good is done by giving access to both ends of the drains. We believe in properly drained land the air is in most cases prevalent enough throughout the whole length of the drains—there is a circulation, so to speak, going on every hour between particle and particle of the soil; but that any regular current of air is or can be produced by leaving both ends of the drain open, we must confess our in-

ability to see. To create a draught it is necessary, we imagine, to have air of different degrees of density at the two ends of a given tube such as the air-drain would naturally be; and as we cannot see how this could occur in a single field, we are unable to see how any current or draught could be established.

Indeed the experiments made by Mr. W. Bullock Webster, land-drainer to her Majesty, and related to the writer of this paper, though as far as he is aware never made public, show that there is no ordinary current or draught in the air drains in question. He placed at a drain mouth a lighted candle, while he had a person to cut open the head of the drain, and so connect it with the atmosphere; and though this opening was made during the period the candle was there, and hence was peculiarly favourable to the creation of a draught, from the probability of the air being at a different temperature at the drain head from that of the outfall or the atmosphere, no effect whatever on the candle was observed; but on applying to the drain head a bundle of lighted straw, so rarefying the air and creating a current, the candle was immediately blown out. This was so far extremely satisfactory as to the absence of strong currents, at least, in the ordinary air drain, and as to the circumstances necessary to create that current, which could never occur in practice by any chance whatever.

Mr. Mechi commenced his improvements as an air drainer, though not as a believer in currents; but he asserted not only that the drains should allow space for the water to percolate, but there was also to be space for the air; and if we rightly remember, he urged that there was to be as much surface below the soil exposed to the action of the air, as the area of the surface itself. Hence he cut his drains not very deep, we think two or three feet, filled up the drain with proper stones, and over these placed the pipe-tiles, to conduct, of course, the air; for until the stone drain was full, the pipe would not act in the way of drainage. We are speaking from memory entirely, but if we remember rightly, the sketch below was something like the figure of his drains in section.

FIG. C.



Subsequently, however, Mr. Mechi completely reversed both the principles and details of his draining; he substituted the small pipe for the large, the deep drain for the shallow, and the ramming down of the clay over the drains for the placing of the pervious stones under them. And yet we must be bound to admit, from personal inspection, that between the two systems, leaving out, of course, the land-springs on porous subsoils, and confining our observations exclusively to the clays, his first and air-drained land is more perfectly drained than his later and deeper drained clays. We are not now prepared to say that the former was not somewhat more favourable to drainage naturally—possibly it might—but we are bound to say that his strong clays near the brook in his farm are insufficiently drained by his small pipes, while his large capacious drains, shallower placed in the soil, appear to us, after inspection made on the spot in the month of February, a period one of the best for observing drainage, to be acting the most efficiently in drying the soil.

The following is his present cost of draining. Depth 4 to 5 feet: average 4. Distance 40 feet from drain to drain.

	Cost per Acre.	£	s.	d.
64 rods of draining at 6d. per rod of 5½ yards		1	12	0
1000 1-inch pipes, 12 inches long, including 44 for breakage, at 12s. per 1000		0	14	6
Cartage of pipes from kiln, four miles		0	3	0

Total cost £2 9 6

That the cutting of drains *per se* will increase the air in the soil—that they may create even a current between the hollow below and the atmosphere—that they will thus tend to the aëration of a large body of its soil—we doubt not, carrying with its train the decomposition of the vegetable, and the disintegration of the mineral matters of the soil; allowing the soil to exercise its absorbent qualities, instead of a continuous body of water acting as a conductor of the manurial elements, there can be no doubt; but that any great draught or current of air in the interior of drains can be established under ordinary circumstances, we must beg leave to doubt.

Is clay draining still then a matter of uncertainty? Can nobody tell us how to drain? and is all the experience of ages lost upon us? We will venture, however, to assert that there are certain principles which are settled; these we will endeavour to lay down, thus premising a solid substratum of practical facts, which are known and admitted, and leaving the rest to be experimented upon and discussed as occasion may require.

First, then, we may lay down this as a great

truism—*That on strong clays a three feet deep drain is of very great service, always safe; and no drain should, if possible, be put in at a less depth.*

Now we apprehend that though Mr. Parkes, Mr. Mechi, and others may smile at this; they may, in their venturesome spirit, say it is a childish fear to stop there, that a greater depth will be better and equally safe, that it is not making the most of science and theory to adopt so shallow a drain; and they will obtain many listeners—many parties will be tempted by their theories; but if a three feet drain will answer—if it is acknowledged to be safe—if it may be relied upon as not being too deep, is it worth while to run any risk for some problematical advantage, or some mere theoretical principle? Nay, if it is the safest mode, is it not worth a little cost to be free from the risk of a failure?

Many of our readers may be aware of a discussion as to the drainage of Phoenix Park, Dublin. It was done at the expense of the government, under the immediate direction of Mr. Parkes. There was money *ad libitum*—there was a fair field—there were no trammels, no restrictions, no difficulties. Mr. Parkes drained the park in his own way, and the public prints—the agricultural periodicals of Ireland—condemned the work, after trial, as inefficient. The *Irish Agricultural Gazette* stated what the park was in 1849—after being so deep drained, and the shallower drains of 1846 taken up; the editor thus describes the state of the park 18 hours after a heavy fall of rain—“Every part was steeped in wet, and plashes of water in some places to a considerable extent lying on the surface; the latter portions near the parallel drains seemed improved, but as we walked from the drains to the centre we were ankle deep—altogether it seemed a most hopeless case.” Now here was a public case—a public challenge of failure which ought to have been answered: it never was—the drainage was manifestly inefficient. This should be a caution to indiscriminate drainers.

Second, as depth and distance bear relation to each other in an understood ratio, the distance between drains must to a certain extent depend upon their depth; and we are again safe in stating our conviction—that it is the most sound and judicious policy in strong clay lands, not to increase the distance between the drains to more than thirty feet, except under very special circumstances.

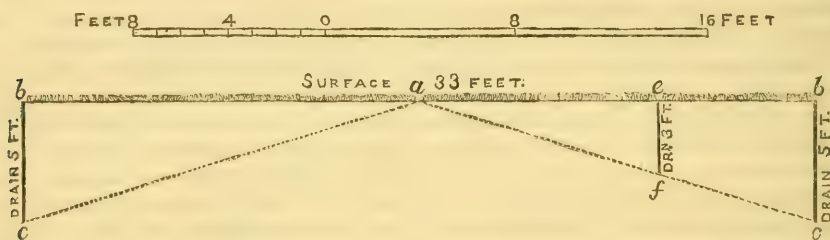
The connexion between depth and distance is not imaginary nor arbitrary; it is real and connected, and is capable of illustration by mathematical demonstration. There is no question of this one fact, that the deeper the drain, *other things being equal*, the more powerful is the tendency for the water to descend. The mere force by which all water enters drains is simply that of gravitation,

or atmospheric pressure; the resisting forces are the capillary attraction of the soil, and its mechanical imperviousness; and the question for the drainer is simply this—whether the long lateral pressure in each particular soil he has to drain is best overcome by shortening the perpendicular distance or lengthening the lateral one? Mr. Mechi, the great defender of Mr. Parkes' system, says in his "Experience in Drainage," "I am still of opinion that from 33 to 40 feet apart is the proper distance for draining *tenacious clays*, the drains being cut from 4 to 5 feet deep. And again, "I am quite sure that the deeper the drain, the cheaper and more profit-

able the drainage. After all, tapping the land when filled with water is like tapping a cask—the lower you put in the tap the stronger will be the stream."

Now we think much trouble may be saved if we investigate the principles which regulate the relative depths and widths of drainage, as connected and alike; and we will endeavour to do this by taking Mr. Mechi's principle, and reducing it to a mathematical diagram. Take his 33, or minimum distance, and 5 feet, his maximum depth connected with it, and this will to a scale represent his surface and depth.

FIGURE D.



Now it must be clear, that, other things being strictly equal, and the land to be drained being represented by the line $b a e b$, the water supposed to be falling on the point a would describe in its descent the line $a f c$, in falling into the drain $c b$, which is five feet deep; and if the distance be 33 feet a line will be described by the water from the point a 16½ feet from the surface to the bottom of the drain. Hence a force which would draw down the water to c , would also draw down the water from the same point to f ; and as the distance is 10 feet 3 inches from the point a to the drain e , it is clear that to be equally efficient drains at 3 feet deep should be 20 feet 6 inches apart, *i.e.*, to have the same effect as drains 5 feet deep would have 33 feet apart. It is therefore partly a question of expense after all; and if it be, the question arises, what is the difference per acre between the deep and wide apart, and the shallower and near drains? A calculation was made as to the cost of relative depths and distances by a prize essayist of the Highland Society, Mr. Robert Elliott, of Hardgrave, near Ecclefechan. His calculation is as follows—"One acre drained at 3 feet deep with drains 18 feet apart, would take 134½ roods (18 feet to the rood), or 2234 tiles 13 inches long. Assume the cost of the tiles at 25s. per thousand, soles 10s., carriage of tiles and soles 8s., and the cost of cutting, laying in the tiles, and filling the earth into drains at 6d. per rood, the cost would be £8 3s. 4d. per acre."

Adopting the same scale of prices, he makes out further, that 5 feet deep and 30 feet apart, 80½ roods

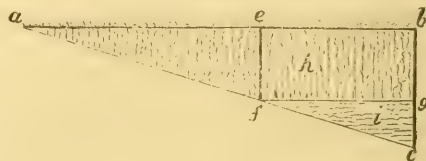
at 1s. 3d., 1340 tiles with soles and carriage, would be £7 18s. 5½d.

Whereas if pipe tiles were used the state of things would be reversed, thus—3 feet deep 18 feet apart, 134½ roods at 6d., 2234 pipe tiles, including carriage, £6 14s. 4d.

And 5 feet deep 30 feet apart, 80½ roods at 1s. 3d., 1340 pipe tiles, including carriage, £7 1s. 0½d.

The question occurs, however, which will be the most efficient? and this we must beg leave to say will depend upon the soil and subsoil, and the rule, we believe, may be safely laid down as follows:—The more porous the subsoil the deeper may be the drain, and as a consequence, the wider apart may the drains be from each other. Now let us assume a very common case. The following diagram represents a soil with a very tenacious and impervious subsoil, at 3 feet deep; we have adopted the above scale for convenience in this figure, as it will make our meaning perfectly clear by taking this course, and the rule will apply with a much greater margin.

FIGURE E.

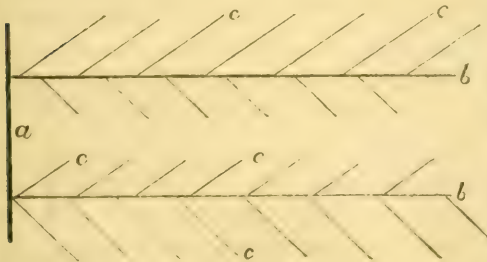


Here h represents the porous, or comparatively porous soil, and i the tenacious impervious subsoil; the water will enter and percolate rapidly and easily

through the former, but with great difficulty through the latter. Now in three feet drains the tendency of the water will be to run in the best possible direction the line *a f*, with a fall the same as it would if not resisted by a tenacious subsoil to the deep drain—or a course of something like 3 to 1; but if the five feet drains are adopted, the tendency of the water will be to describe the course *a f g c*, or in other words to sink to the level of the tenacious subsoil, and pass along that subsoil to the drain. This of course creates the difficulty of a practical 3 feet drain, at a greater distance; and it also increases the cost of cutting very materially, for the two feet of subsoil will cost by very far more cutting than the three feet of more porous and manageable surface soil. So that this point again refers itself to the same ultimate proposition as every axiom in draining—that instead of adopting any one blind theory for all soils, we should be guided by the soil and circumstances of each locality, and that it is always the safest in extensive operations to trust to a competent inspecting engineer, rather than follow any man's blind theory.

The *direction of drains in clays* is a matter of almost as much controversy as the other great points in dispute. In sands they may be just in such directions as to bisect the beds of impervious material, and tap the springs; but in clays, where one vast mass of tenacious soil is to be freed from its excess of moisture, a different course is necessary. A regular system of veins has to be made to collect the water, and discharge it to the lowest point or main drain; and whether across the ridges, or down the furrows, whether at parallel lines, or in oblique or obtuse angles, they must be placed in a well understood and regular rotation. The parallel drains have at least this advantage, that if they should unhappily be placed at too great a distance, it is very easy when they are so disposed to place a drain between every original drain, and so in effect to double the abstracting power, which may not be the case in every other mode of drainage. A very fashionable mode was once the one of branch drains, thus—

FIGURE F.



It was alleged that the tendency of water run-

ning into the drains at the angle referred to, would have a more powerful and cleansing efficacy, than it could have when a merely longitudinal force was employed, and that the water would meet with less resistance at a point where an acute angle presented itself, rather than where a right angle supervened. The main drain might also be laid on upon the same principle.

The *direction of drains in relation to the fall or inclination of the land*, is also another vexed question in the drainage of clays. It is urged that where the slope is considerable there is a constant tendency to wash away the soil, where the inclination is direct, and immediately with the descent; and if it be very severe, there are doubtless strong reasons why the inclination of the drains should be somewhat oblique to the fall. But there are those who advocate the drains to be exactly at right angles with the slope of the ground, and these are amongst the tenacious holders of opinion on these matters. A moment's reflection will at once manifest to the most casual observer, that while a drain cut down the slope will receive the water both from the sides, the top, and possibly also the bottom; one across the slope will only receive the water *at one side*, an objection, in our estimation, quite fatal to the hypothesis.

Two years ago Mr. W. Bullock Webster furnished us with the results of his experience, as

AXIOMS IN DRAINAGE.

We cannot do better than give them entire, as they deserve repetition and wide circulation, and with most of them we must give our most cordial assent. They are as follow:—

Depth must be governed by the nature of the soil subsoil, and cause of wetness. For springs even 15 feet are requisite often. For porous soils 3, 4 and 5 feet. For strong clays, and clay subsoil, and surface water, drains 30 to 36 inches at moderate distances, in preference to deeper drains and great distances; ample proof has been given to show that such drains have failed.

That all water should percolate through the subsoil before forcing into the drains.

That if under-water exist, it should be removed, except under peculiar circumstances; that water should pass through the soil quickly, and not to take days to get off.

That grass-land may be over-drained.

That the state the land is in for agricultural purposes is the test for draining; not the quantity of water that runs in drains.

That no tile or pipe should be used less than 1½ inch bore; that two inches are much better.

That all land can be effectually drained at 5 feet, some much less: and it should be done in such

a way that every drop of rain that falls should be of value instead of injury.

It must be confessed to be painful and humiliating to have to admit at this moment ignorance as to the best mode of draining clays; but it is not really more so than any fact in agriculture—take a manure for instance, and the same rule applies. With all the modification of soil, situation, climate, geological formation, and a thousand minor influences, who knows intuitively, or by general principles, exactly what manure to apply to any given soil, until he has local or scientific data upon which to found his observations, and from which to draw his conclusions? It is equally improbable that any one general rule, however excellent, can be made of so general application, in draining strong soils, as to be resolved into an axiom. A soil called clay in the Lothians, would in Yorkshire be called a loam; and it must

be confessed our northerners know as little of the Buckinghamshire clays as they know there about the Lothian farming; and to suppose that any general rule for all descriptions of clay soils can ever be laid down is to suppose one of those ideal theories which have their bases on ignorance and quackery.

Before an estate is drained, it is by no means a bad plan to try a given portion at a given and registered depth and distance, so that the effects may be watched and guarded, and this experimental piece made the basis of future operations; for if an engineer, however able, is brought over, he may not be quite free from error: so we think a landowner would do well to take the best advice, and then adopt it on a small scale, before he attempted any great expenditure in the drainage of clays on any given system.

Sowerby, Thirsk, Sept. 26, 1850.

GREAT EXHIBITION OF 1851.

The following paper, written by M. Charles Dupin, is addressed to the manufacturers and producers of France, suggesting to them how they may most effectually compete with us at the approaching Exhibition. It enters upon almost every branch of productive industry, giving statistical detail and much information.

Having been brought under the notice of the Westminster local committee, they have felt so interested in its perusal, and consider the various statements so highly important, that they have translated it with the view of circulation in their own district, and think they shall be rendering a service to our manufacturers in forwarding it also to the various provincial committees.

If anything can rouse the energies of our own manufacturers and producers, the perusal of this document will surely have that effect. It will there be seen how impressively the nation of France is called upon to compete at our Exhibition; how it encourages them to come forward and strive for certain objects, even with slight grounds for hope of success; how they are incited to sustain, with increased *éclat*, the honours they have already obtained; and how they are, in fact, required to extend the renown of their country, by concentrating their powers to produce, in this one year, the improvements and excellencies that would otherwise have spread over the intervals till their own Exhibition, in 1854.

It is not for the Westminster Committee to offer any remarks on the various arguments and statements recorded in this address by Monsieur Charles Dupin; their truth or their exaggeration will be

best appreciated by the different manufacturers or producers whom these statements may more immediately concern.

Committee-room, Pall-mall East, London,
August, 1850.

SUGGESTIONS ADDRESSED TO THE PRODUCERS AND MANUFACTURERS OF FRANCE, AS TO THE PRODUCTS IT IS DESIRABLE TO SEND TO THE EXHIBITION.

Great Britain, in the midst of her progress and internal peace, challenges all the disquieted nations to a combat of industrial skill. She appoints her meeting at London, on May 1st, 1851.

If France had chosen her time, she would not have selected the period between 1850 and 1852; she would not have selected that era in her life, when such severe struggles have enfeebled her for the present and weakened her confidence in the future.

France, nevertheless, will not complain of the courtesy of an appeal which tends to bring nations together in assembling the works of their hands; impoverished, or rather less rich as she is, by struggles too long continued, she yet retains sufficient strength and courage not to decline an honourable and loyal combat.

Among the products valued at 180,000,000. (£7,200,000) which our agriculture and our manufacturers send each year to England, we shall be able to make a skilful and correct choice, supported by a sanction the least exceptionable of all, that of the consumers of Britain.

With the products already fit for immediate use, we may exhibit our improvements—our more recent inventions, where the aim is to advance still more those trades in which we have already taken the lead.

No living being is entitled to claim perfection for the arts useful to man. They are progressive in their very nature, and often when they are thought to be carried to the very highest point of excellence an unexpected discovery opens to them a new career.

There are no longer mysteries in works enlightened by science; everywhere theory is sufficiently advanced to produce anew the discoveries of processes of which the simple result is made known.

Such are the motives which should encourage us to exhibit to the world even our means of production. We ought more especially to do this in a competition where our rivals will also show us theirs.

At present, let us throw a glance over the kinds of French products that we should wish more particularly to see forwarded to London. We will follow very nearly the methodical order indicated by the official returns of our exportations.

ANIMAL KINGDOM.

England does not admit to her Exhibition any living animals: we will content ourselves by supplying her markets with our sheep, and horned cattle, our poultry, and especially our eggs.

Let us speak of the products derived from the animal kingdom.

We must avail ourselves of the Exhibition to offer to the sumptuous and *recherché* tables of Great Britain our most esteemed butters, and our varieties of cheeses, so well appreciated by connoisseurs.

What we shall presently say of vegetable preserves will apply to the ingenuity shown by France in the preservation of the choicest food furnished by the animal kingdom. Ingenuity of this kind ennobles itself by the succour it affords to navigators, soldiers in campaign, the sick, the wounded in the hospitals.

We should try on this occasion what wools of France and Algeria are worth the notice of the foreigner; whereby we shall be enabled to direct the development and the training of our flocks, both in the mother country and on the borders of the Atlas.

The agriculture of France finds in England an important market for many sorts of raw and spun silks; we must exhibit all our resources, and the varied qualities of our goats' hair, &c. (*setifères*): the greater the demand of the foreigner for these productions, the greater the abundance we shall create for our own manufactures.

Our dyed silks, both for weaving and other purposes, are worthy also of being offered for competition.

VEGETABLE KINGDOM.

Within the last few years the markets of England have afforded us an important opening for our wheat and other kinds of grain.

The English have a high opinion of our farinaceous preparations, our groats, our biscuits de Rheims, and those of Paris, and our pastes, imitating so remarkably those of Italy.

The skill of the French cultivators has succeeded in producing great improvements, and many new varieties of our most delicious fruits. If we add to them those of Corsica and Algeria, we shall form a collection of the most perfect and beautiful products of the temperate zone.

Part of these fruits would not retain their freshness, or would not be ripe at the time of the exhibition; but we can send them preserved by the skill which our Apports and Chevetts have contrived for forwarding them to the most distant parts of the world.

Our preserved fruits from the south will bear comparison in every respect with our fruits of the centre and north of France: let us be careful not to forget them.

Provence, by the skill of its producers, prepares the oil of olives in greater perfection than in any other country. At the same time, Algeria can show specimens of her cheap oils, fit for manufacturing purposes. She can also exhibit her cork, likewise her woods, so richly coloured, and of such varied shades, for cabinet work.

In madder we have a material for dyeing, esteemed in England; it must be exhibited in all its forms, employed in commerce, green, dry, and powdered.

There may exist, there certainly do exist, productions both of the vegetable kingdom, and of the two other natural kingdoms, which have acquired only a very limited sale up to this time, but which promise much for the future. We must depend on the intelligence of our producers and merchants, to bring prominently forward the value and importance of these productions, by exhibiting the most remarkable kinds, obtained in the most perfect condition.

MINERAL KINGDOM AND VARIOUS MANUFACTURES.

Our soil is rich in bitumen, which, for several years, has formed a valuable item in our exports, and especially to England.

If nature had lavished on us, as on Great Britain, in the heart of the same mountains in proximity with navigable canals and railroads, the mineral, the sand for casting, and the coal, we should also produce cast and wrought irons, which would bear comparison.

Notwithstanding this disadvantage, which we will not attempt to disguise, yet where the iron has undergone the processes, where subsequent mechanical ingenuity can compensate, French skill recovers from the disadvantage of the more expensive raw material.

It is by these means that she is enabled to sell, even to England, certain kinds of wire, sheet iron, and steel springs.

We sell also in England our rolled and drawn metals, and especially our zinc: we are able, then, to send these for exhibition.

We appeal to the chemical arts, brought in France to such perfection for the preparations, more numerous every day, of oxydes and acids, alkalis and salts, which are supplied to every nation by the commerce of France: here we may exhibit productions remarkable for their invention, im-

provement in the mode of preparation, and diminution in the price.

The preparation of colours owes no less to French ingenuity: witness the artificial ultra-marine.

The art of reducing into impalpable powder dyeing substances, and matters which are used in pharmacy, has made new and remarkable progress in France; in this, mechanical ingenuity has succeeded in combining simplicity, cheapness, and efficiency.

We may present at the Exhibition our superior pencils in which trade France has already taken the lead.

The perfumers of France extract most skilfully the natural aroma from our plants and flowers of the Alps and Pyrenees, and soon, we hope, from those of the Atlas. After the United States, England is the greatest consumer of our perfumes.

To France is owing the extraction of quinine and its preparation under the form of sulphates. This is one of our claims on the consideration of mankind.

Our common soaps form an unimportant part of our exportations to Great Britain.

The art of equalling wax candles by the stearine acid belongs to the scientific discoveries of France. It is a title to be maintained at the Exhibition, by showing all the progress this valuable manufacture has made.

We have brought the manufacture of our glues and gelatines to such a degree of perfection, that we may exhibit them with confidence against the most improved specimens.

The tobacco of our manufacture, for a long time imperfect, now possesses qualities esteemed by foreigners. We must show our very best specimens of this material.

England, who produces no wine herself, allows of none to her exhibitions, but she admits the various kinds of spirits.

France possesses brandies, the most choice of liquors; she has others also wonderfully cheap—two qualities equally valuable.

Great Britain purchases more than a third of the brandies which France exports to all the countries of the world: it is the most conclusive recommendation.

Let us now proceed to other manufactures in the common descriptions of pottery, as in cast and wrought iron the price of the fuel accounts for our inferiority. But when we are in the neighbourhood of coal, as at Sarregueimes, we can take our place with the productions of Staffordshire.

At Sarregueimes arose our manufactures of artificial porphyry, appropriate only to the splendour of temples and palaces.

The manufacture of porcelain is an art where French genius finds a field for its combined excellences—economy in fuel, simplicity in mechanical contrivance, taste, and elegance of form, colour, and design; these are what foreigners appreciate in our cheap, elegant, and beautiful porcelain. Limoges and Paris will prove at the exhibition of London the respective merits of their manufactures.

In the common kinds of glass, as in pottery and wrought iron, the price of fuel is our adversary.

We enter the lists with advantage in the superior manufactures of glass; we must exhibit our mirrors,

polished by an improved process; our glass, coloured by an ingenious chemical application; and the glass manufactured with zinc instead of lead, which gives promise of increased refractive power to our lenses for optical and astronomical instruments.

The manufacture of thread and woven goods presents so many branches where we hold the highest rank, that we may, without hesitation, acknowledge there are some in which we cannot maintain a competition with England, such as the spinning of cotton by machinery, which originated in England twenty-five years earlier than in France. At the present day we can spin it equally well, but not at so low a price.

By unceasing efforts we are able, nevertheless, by means of system and economy, to introduce some of our printed and dyed fabrics even into the markets of Britain: this honour is shared by the unpretending fabrics of Rouen, as well as the richer productions of Alsace. Generally, our wool is dearer than that of England; so also for the same reason is our worsted yarn, and common cloth; there are, nevertheless, certain kinds of spun wool supplied by us to England.

Notwithstanding the disadvantage of price in the raw material, our fine cloths, kerseymeres, our mixed stuffs, and our so-called Ternaux shawls, find enlightened purchasers in the British markets. The article merinos alone figures in our exports at the sum of five millions of francs (£200,000). A careful selection must be made of these various products to be sent to the exhibition.

Generally, our common carpets have not the advantage of cheapness, but our richer carpets and hangings are unrivalled. Fine art allied to mechanical skill augments still further the merit of this manufacture.

I now come to the most brilliant of our textile products—to the manufacture of silks. Notwithstanding the high duty which England continues to levy on French silk goods, which are a flattering admission, we have here the proportion which England buys from us in comparison to the rest of the world:—

WOVEN SILKS SOLD BY FRANCE.			
		To all other countries.	To England.
Figured silks	20	100	
Plain silks	47	100	
Silk ribands	57	100	
Silks mixed with other material	50	100	
Silk lace	51	100	
Fancy goods	56	100	

We hope that Lyons, St. Etienne, Avignon, and Nimes, will show the productions of their ingenuity, from the goods remarkable for their lowness of price, up to the *chefs-d'œuvre* of elegance and richness. We ought also to be able to exhibit our superiority in another kind of fabric, that of hemp and flax, if we had availed ourselves at first of a French discovery of the means of spinning flax by machinery; the Scotch and English have borrowed our invention, to forestall us; they have got a-head of our sluggards, and it is just.

The tasteful hand-work of Parisian industry has

given to all our textures a superior elegance which heightens the merit of the stuffs in general use, prepared in our workshops of Paris; a considerable part of these stuffs is sold to England—scarcely necessary, I think, to offer this weapon against us at the English custom-house.*

We have already spoken of cotton-wove gloves; let us now point out an humble kind of material, which may prove of importance in Algeria; it is that obtained from the fibres of bark or of reeds. The simplicity, the cheapness, the elegance even of these productions recommend them for summer apartments.

The foreigners appreciate our card-work in its varied forms, and our finer papers are worthy of figuring beside the best English papers.

We have brought to a high state of perfection our printed paper-hangings, both for beauty of colouring, for their adjustment, and for elegance of design. It is important that our most beautiful specimens should be exhibited, as well as those of the cheapest kinds.

Printing, considered simply as a mechanical art, allows no longer a superiority among nations where the arts are already advanced.

But the printing of works requiring both science and erudition marks always the intellectual advancement of nations by the perfection of its greatest enterprises. It is honourable for France to offer works of this description, either very lately completed or in the course of execution. France possesses, at least, one family of printers who revive again the Estiennes, the Aldi, and the Elzevirs, in combining the technical skill of their profession with the learning, the taste, and the genius of those fathers of literary and scientific typography. Among the monuments of French typography must be reckoned the matchless collection of types of the *Imperiale Nationale*. I should instance more particularly the separation into parts of the Chinese characters, invented and carried out by a Frenchman, in order to obtain results of which the Chinese themselves are not aware.

The printing and engraving of music have made most remarkable progress through the ingenious combination which our typographers have invented. The English have originated the continuous impression employed by the newspapers. An invention which is now being perfected will enable us to offer to London the means of obtaining, in the shortest space of time, the multiplication to an almost unlimited extent of the copies of a newspaper.

French taste has carried to a great extent the branch of fancy printing for visiting cards and circulars of all kinds, with the most diversified ornaments.

Lithography, both plain and coloured, has made unceasing progress. We are enabled to show works of the most varied kinds, which satisfy most thoroughly on the one side the cheapness demanded

by ordinary trade, and, on the other, all that can be required by fine art in taste, elegance, grace, or power.

England purchases from us yearly lithographs to the amount of nearly £40,000; that is to say, a larger value than all the books, foreign or English, that she borrows from our press.

After having seen what may be required, both as to paper and in those works of which paper is the principal material, let us now direct our attention to skins or hides, and what they can be applied to.

England purchases from France our tanned and dressed hides, which are used by its bootmakers; this article alone yields an annual business of three millions of francs (£120,000).

She appreciates equally our superior morocco leather. Even to this day, she finds it more advantageous to purchase our gloves rather than the lamb-skin of which they are made.

The art of cutting and sewing gloves, both for men and women, is one in which we excel.

We possess, at present, the description of hides best adapted for the superior kinds of harness, and our first saddlers combine elegance of form with sound workmanship. We appeal to their spirit of enterprise to establish at the exhibition at London, a well-deserved renown for the harness of France, even at the side of that of England.

We call equally upon our most distinguished carriage makers to send to London their town and travelling carriages, executed in the most finished style of comfort, elegance, and solidity. They possess materials of most perfect quality—wood, iron, brass, leather, colours, and varnish. Let them exercise their good taste and experience, and they will appear with honour.

The hat manufacture of France is at present as varied in the materials it employs as in the ever-changing forms it applies them to; the hat manufacturer should by strenuous efforts attempt a competition which it is in a condition to sustain with honour. To Paris and Lyons should be confided this task.

The elegant work of straw-bonnet making in French straw may equal the fabrics of Florence; it has already made progress in the English markets.

We ought to have been able to export to England our sickles and scythes, if we were better acquainted with the particular excellence of the raw material, which should ever be considered as the element of definitive success.

Gold and silver-smiths' work and jewellery are amongst the arts carried to the greatest perfection by the Paris workman. It is a glory to be sustained.

Strange! almost all our imports of goldsmiths' work into England are wrought in silver; while, on the contrary, our jewellery that she buys is almost all in gold.

The clock makers of France sell annually to England clocks to the value of nearly £40,000, and of watches not one, either in or out of cases. The experiments in movements made by our manufacturers deserve a better fate; it is very desirable that they be exhibited.

The construction of chronometers is carried on

* As the sense of the above seems obscure, we give the original French:—"Une partie considérable de ces effets est vendue à l'Angleterre. Inutile, au moins je pense, de donner cette arme contre nous à la douane Anglaise."

at Paris with a perfection that will stand the test of the most minute experiments of our astronomers, and the proofs at the Observatory. Our chronometers should be exhibited to show the state of precision to which France has brought this art.

In the manufacture of machinery it is not the genius of invention that is wanting in France; it is the low price of the metallic mineral of which they are more and more composed, and especially of iron and steel.

Notwithstanding this disadvantage, by economy of fuel and workmanship, and by means of certain kinds of machinery, we are enabled to export in this branch to the extent of half a million francs (£20,000) a year to England.

Our manufacturers construct locomotives which, even in price, are on a level with those of Great Britain; equal also in workmanship. Let us compete in *locomotives*!

We can exhibit also portable arms, guns, pistols, sabres, which combine every desirable quality—strength, precision, certainty in loading, elegance of form, goodness of temper, and taste in the ornaments. We have revived the manufacture of damasked arms; we equal in taste and richness the fine productions of Italy, Spain, and the East, even in the best eras of their works in this kind.

The foreigner seeks our surgical instruments for their ingenious form, their perfect temper, and their comparative cheapness; we fear not to state that no people have done more for humanity than our own, by contriving new or improved instruments for the most varied and important operations.

We will not enumerate the arts so various which constitute more particularly our Parisian trade. We know how the stamp of elegance, contrivance, or richness characterises the works of the capital. We must make a selection of objects remarkable on the one hand for cheapness, on the other for richness, and always for taste.

Turned ware, fancy trimmings, and embroidery; fans, parasols, and umbrellas; all these objects, representing millions taken collectively, acquire importance.

Let us not forget a branch of trade which, assiduously studied, rivals Nature itself; this is the production of artificial flowers in every possible variety. Of these France sells to the extent of a million francs (£40,000) to the foreigner; and England, with the United States, purchases more than half this amount.

In reviving the furniture of the Moyen age, and of the Renaissance, as also that of the period of Louis XIV., the joiner and cabinet-maker have taken a remarkable position in our export trade. England is by far our largest consumer, and it is her approbation therefore we should the more endeavour to obtain.

We are rivals with her in mathematical instruments, and in those of philosophy, optics, and astronomy.

Our musical instruments are worthy also of comparison. We desire to see appear in this exhibition of London, by the side of our harps and

pianos with the latest improvements, our violins, tenors, and violoncellos; it is allowed that our best makers manufacture these stringed instruments equally as well as the most celebrated old Italian makers.

In wind instruments we can exhibit to England every size of the organ, from the small instruments intended for an oratory up to the magnificent tones which are fitted for a cathedral.

It is especially in regard to military music that we can show that a complete change has been effected by the improvement of old instruments, and the invention of new ones by France. The Horse Guards of England have borrowed from us these instruments for their band. It is a patent of excellence.

The softest and the deepest of these new instruments enrich the orchestras of our concerts and our theatres. At present brass no longer triumphs over the soft harmony of our expressive music, in blunting by dint of noise the delicacy of our auditory senses.

We have here a sketch, though certainly too incomplete, of the principal objects of our manufactures, which appear worthy of exhibition to the assembly of all nations.

We are far from thinking that we have enumerated all the products, and all the means of production which are worthy of competing at this Exhibition.

In such a wide field of industry as that of France, most of the arts are continually progressing; the greater number, it is true, by degrees insensible to the superficial observer; some of them are almost daily signalised by an unexpected improvement. Not a year has passed since the products exhibited last summer at Paris were completed; they represent no longer the state of perfection of our works, and next year, in the month of May, the difference will be greater still.

It will be for the exhibitors of France to carry out for 1851 what they would do for our own Exposition of 1854—they must surprise us by bringing forward improvements, inventions, of which we dare not yet claim the honour for our manufactures.

I shall finish this notice by an urgent request addressed to the Chambers of Commerce, as also to the consulting committees of manufacturers; it is to ask of persons who wish to exhibit at London the exact amount of space they will require for the exhibition of their goods?

When the central committee of Paris shall be informed of the necessary amount of space required by our exhibitors, they will be able to arrange their demands at London, and communicate afterwards to each branch of trade the respective space they may depend on obtaining.

In fine, it will be important that these returns addressed to the committee, through the Minister of Agriculture and Commerce, be not too long delayed.

(Signed) CHARLES DUPIN,
President of the French Committee for
the British Exhibition of 1851.

Paris, May 3, 1850.

DISCUSSION ON THE FEEDING OF FARM-HORSES.

In pursuance of the resolution of the directors, to record in the Transactions of the Society the discussions which take place at its monthly meetings, on the most important of the subjects which come under review there—and which resolution was announced in the report of the first discussion that took place, contained in the number of the Transactions for last July—the following discussion on the feeding of farm-horses is submitted to the notice of agriculturists, as containing the practical opinions of those who took part in the discussion. The chair was occupied on the occasion by Sir John McNeill.

MR. JOHN GIBSON, Woolmet, near Edinburgh, opened the discussion by observing:—Upon the important subject of the feeding of farm-horses, I shall confine myself entirely to my own experience; but previous to taking up the subject of feeding, which is more immediately before the meeting, I hope I may be allowed to make a few remarks upon the breeding and rearing of farm-horses. I have generally found that those bred upon the farm are more hardy, easier kept, and less liable to disease than those brought from a distance. Great care and judgment ought to be used in the selection of the animals bred from: the sire and dam ought to be well shaped in their different parts—sound, strong, well-formed limbs and feet, with good action, good temper, and sound constitution. Many inferior animals are bred, which is most frequently the result of the injudicious selection, and constitutional defects of the parents, than from any other cause. Cart mares ought not to foal until the spring work is over, and the prospect of grass is near; and when the foal is weaned in autumn, it ought to be fed with nutritious food. In winter, young horses ought always to get a due proportion of soft food, and be kept in a roomy place, where they can take the necessary exercise; and where enclosures are conveniently situated for letting them run out in fine weather, it will be found most beneficial. They ought not to be put to grass too early, and should be prepared gradually for the change, and upon no account let them remain at grass too late in the season. They should be carefully and frequently handled, and kindly treated; and when thus attended to they are easily trained to work. When changing their teeth they have difficulty in masticating their food, which should then be soft and nourishing; and if at this period they are allowed to get into too low condition, it impoverishes the blood, checks the growth, and

renders them more liable to diseases at future periods. If it can be avoided, young horses ought not to be put to work before they are three years old, nor carted before five, as the better they are treated at this tender age the longer will they wear. In the construction of farm-offices it too frequently happens that sufficient attention is not paid to the stable accommodation of this most useful animal. Stables ought to be at least 18 feet within the walls, and the width of stall for a full-sized cart-horse should not be less than 6 feet; and particular attention ought to be paid to the stable being well ventilated. There are few diseases in the horse that cannot be traced to some cause; and were these causes more generally attended to by those having the management of them, many troublesome and fatal diseases might be prevented. Nothing is more essential to health than cleanliness and careful grooming: at no time, when in a profuse state of perspiration, ought they to be allowed to drink cold water, or to stand exposed to the inclemency of the weather; and when they have been exposed to wet weather, they ought to be carefully rubbed down, and a covering thrown over their loins. I disapprove of horse-ponds, as horses are often taken there when over-heated, and to save grooming: I prefer the application of the curry-comb to cold water. Regularity in feeding is also of the greatest importance; if, from some cause or other, on any particular day this has been prevented, on no account ought an increased quantity of food to be given, at once, to make up the deficiency. At no season of the year ought the horse to be allowed to get into too low condition, as it will generally be found that poverty generates disease.

The system of feeding I adopt is as follows:—From the middle of October till the end of May my horses get one feed of steamed food, and two feeds of oats daily, with the best oat or wheat-straw for fodder. I never give bean-straw, unless it has been secured in fine condition, having often seen the bad effects of it—partly owing, I think, to its long exposure to the weather. In our variable climate, and from the quantity of sand which adheres to it, I use it generally for litter. The steamed food used is well-washed Swedish turnip and potatoes, in equal proportions, mixed with sifted wheat chaff. In those years when we had a total loss of potatoes, Swedish turnip alone was used, but not with the same good effects as when mixed with potatoes. This year having plenty of diseased potatoes in a firm state, I give a larger

proportion of potatoes than turnip, and never upon any occasion give oat husks, commonly called meal-seeds, having often seen their injurious effects. At five o'clock in the morning each horse gets 6 lbs. weight of bruised oats, at noon the same quantity of oats, and at half-past seven p.m. 47 lbs. weight of steamed food. I find that it takes 62 lbs. weight of unsteamed potatoes and turnip to produce 47 lbs. steamed: to each feed of steamed food 4 oz. of common salt are added, and mixed up with one-fourth part of a bushel of wheat-chaff, weighing about $1\frac{1}{2}$ lb.; a greater quantity of wheat-chaff than this having generally too laxative an effect. Each horse eats from 14 lbs. to 18 lbs. of fodder during the twenty-four hours, besides what is required for litter. In spring I sometimes give a mixture of bruised beans and oats, instead of oats alone: from June to the middle of October, those horses that are required for the working of the green crop, driving manure, and harvest work, are fed with cut grass and tares in the house; and about 7 lbs. of oats each day, given at twice, increasing or decreasing the quantity according to the work they have to do; and I turn out to pasture those horses only that are not required until the busy season. I disapprove of horses that are regularly worked being turned out to grass, and exposed to all the changes of our variable climate—as I believe it to be the origin of many diseases. The expense of this mode of feeding, at present prices, in this district, for each horse per annum, is as follows:—

12 lbs. of oats per day, for 30 weeks, is $7\frac{1}{2}$ qrs. (of 42 lbs. per bush.); 7 lbs. do. do., for 22 weeks, is $3\frac{1}{2}$ qrs. = $10\frac{1}{2}$ qrs. at 17s.	£9 0 7
145 stones straw consumed, at 4d. per stone of 22 lbs.	2 8 4
Each horse consumes 5 tons 16 cwt. of turnips and potatoes in 30 weeks.	
58 cwt. potatoes, at 1s. 6d.	4 7 0
58 cwt. turnips, at 9d.	2 3 6
53 lbs. salt, 1s. 8d., 52 bushels wheat-chaff, 4s. 4d.	0 6 0
22 weeks on cut grass and tares, at 9d. per day	5 15 6
	£24 0 11

For the 30 weeks, the keep of each horse per day is 7d. for oats, $7\frac{1}{2}$ for steamed food, and $2\frac{1}{2}$ for fodder, or 1s. 5d. per day; for the 22 weeks the keep is—grass 9d., oats 4d., or 1s. 1d. per day. The expense of preparing the steamed food, including coals, is $\frac{1}{2}$ d. per day for each horse. 260 stones of straw will be required for litter for each horse during the year: for this no charge is made, as it is left in manure. By this mode of feeding, the horses are always in fine sleek condition, and able for their work. I have acted upon

this system for the last 15 years, have always had from 16 to 20 horses, and during that period I have lost only 7 horses, 3 of them from accidental causes; and I attribute this, in a great measure, to the mode of feeding, and in particular to the steamed food.

Mr. BINNIE, Seton Mains, said—For the most part, the soil of my farm is naturally light, and the system I have generally followed in feeding my work-horses has been attended with success. I consider that economy in feeding the horse embraces the health, condition, and stamina of the animal; and I have found those ends well served by adopting, as nearly as possible, the following mode of management:—viz., from 1st October to 20th May my horses are fed thrice a-day; the morning and mid-day feeds consist of 7 lbs. of oats and bruised beans each feed (one part of the latter to two of the former), the present cost of both diets will be something like 9d.; the evening's feed is composed of 35 lbs. turnips, and 6 lbs. barley, well boiled together, which (with the expense of coals, salt, and woman's wage for cooking,) I put down at $6\frac{1}{2}$ d. I only use wheat or oat-straw (uncut) as fodder, and I will take the cost at 3d. a-day. From 20th May (when, by top-dressing, I have generally cutting-grass) until 1st July I allow two feeds of oats and beans, as I have before mentioned, and as much cut grass as satisfies the horse in the stable during the day, and turn him to the pastures for the night. From 1st July to 1st October I find, on an average, that my horses consume, as nearly as I can calculate, a feed of oats each per day; and, taking cutting and pasture grass at £7 per imperial acre, my statement resolves itself into a cost, as nearly as possible, of £28 10s. per horse per annum. In my calculations I have assumed the value of 42 lbs. oats to be 19s., 65 lbs. beans 28s., and barley weighing 53 lbs. the bushel 20s. per qr., and turnips 15s. per ton. I can strongly recommend the black Tartarian oat for the use of the horse, as, from its peculiar formation, the horse is necessitated to masticate it thoroughly, and it has also the advantages of giving a very large acreable produce, and having a high standing in the oat class for its fineness of husk and mealing properties. I would also advise the growth of the white Belgian carrot, as a most nutritious, safe, and economical article of food for the horse. It is easily raised, and can be grown to yield eighteen tons an imperial acre on moderately free land. On account of the carrot keeping its moisture much longer than the turnip, I have found it most beneficial in its raw state, for spring feeding. I beg to close my remarks by saying, that home experience, as also that acquired while engaged as inspector to a cattle insurance company, have taught me that too

much care cannot be given to the properly ventilating and cleansing of our stables, and also, in the winter, to give an hour's walking exercise on the Sunday mornings; as I am convinced, that more horses are lost by inattention to these points, than by any mode of feeding I have ever seen practised in the Lothians.

Mr. STEEDMAN, Boghall, observed—I can give you no mode better and more economical than the one I myself adopt. In the morning, my horses get 5 lbs. of oats, along with two or three small Swede turnips (raw), and the same at twelve o'clock, or dinner time. In the morning the boiler is filled with 56 lbs. of turnips, and $\frac{1}{2}$ lb. of linseed for each horse: the linseed being difficult to boil, is put into a small bag, and then placed in the middle of the boiler, amongst the turnips; when boiled without a bag it is apt to boil over, and liable to sit on and burn, and in consequence the most nourishing part of it is lost: after the turnips and linseed are boiled, they are thrown into a large trough or cooler, and a little wheat-chaff, along with a handful of salt for each horse, well mixed together, and cloths, or a lid for the purpose, put over the cooler, and allowed to cool slowly. The weight of the turnips being 56 lbs. when put into the boiler, you will find reduced to about 40 lbs., one-half of which is given at dusk, or whenever the horses return from work, and the remainder at eight o'clock, when the men clean and do them up for the night. The expense of the oats and turnips, twice a-day (at the present prices), is about 8d., and the boiled food 5d., making in all 13d. a-day—giving them oat-straw, upon which I place no value, considering it as an equivalent for the manure from the horses. Under this system, which I have adopted for the last six years, I have found my horses healthy, in good working condition, and always ready for their work, working them from daylight to dark in the winter months (except when they are feeding in the middle of the day); and, when prevented from farm operations by the weather, they go to Edinburgh for dung, and seldom, or I may say, never return, with a less load than 30 cwt. Previous to boiling, I used to steam turnips and potatoes, but lost upwards of 40 horses, and since I commenced to boil, have been at a great expense with boilers cracking; but, for some time past, have used a malleable iron boiler, made by Mr. Slight, engineer, Leith Walk, which I find to answer the purpose admirably. In spring, instead of giving the horses oat-straw, they get hay, which increases the expense about 3d. each; but their work being harder, and hours longer, I consider it necessary. In summer they get grass, costing about 6d. each, which I believe to be far more profitable than driving it to Edinburgh and getting a shilling, in consequence of

making more manure, and saving labour. I may mention that the late Mr. Scoon, tenant of Pentland Mains (an adjoining farm to mine), used to feed his horses with two feeds of oats a-day, and at night they got raw potatoes, just as they were lifted from the pit or potato-house, only riddled, and during his nineteen years' lease, never lost a horse. The present tenant, Mr. Brown, has nearly run another nineteen years, and to my knowledge has lost fifteen or sixteen horses, and he feeds them differently. The only way I can account for this, is that Mr. Brown feeds higher and works harder. The breed of horses Mr. Scoon had, was one rare to be seen now-a-days; they were mostly all blacks, with short legs and backs, deep ribbed, broad chested, with a good flat bone, and rare action—very unlike the present breed, long legged and backed, narrow chested, and with as much hair and clay on their legs, carrying along the road, as I am sure would weigh more than 4 lbs. The great point in keeping horses in good condition, and consequently keeping them cheap, is to feed them regularly, and have them well groomed; also to attend to the ventilation of the stable, which, I regret to say, is rather overlooked in many cases. In addition to the present ventilators, which you frequently see placed on the roof of a stable, there ought to be a common drain-tile, about three or four inches in diameter, built in the wall, from three to four feet above the horses' heads when standing, and four feet apart—the same on the opposite side, or behind them; then you will always find your stables sweet and wholesome, the horses healthy, and with good appetites. There is apparently a great loss when horses are feeding, in consequence of the mangers not being properly constructed: I would, therefore, strongly recommend all those who are about to build a stable, to have cast-iron mangers, placed on one side, bevelled in the bottom, and with a projection over the inside about three inches. I have no doubt but that most farmers have noticed horses, when feeding, throwing their meat out of the mangers with their noses, and frequently in considerable quantity, which does not occur if the projection I have spoken of is attached to the manger: and there should be a rack on the other side, filled with hay or straw, as horses frequently eat when lying. Grain, at the present prices, would be cheaper than turnips to boil; but the change on the system of feeding might possibly lose a horse or two; and I, nor, I believe, any other tenant, is at present in a position to try experiments, which might perhaps add materially to the loss of money we are now experiencing, and which had little need to be increased. I am, therefore, contented to let well alone, as far as the feeding of horses is concerned.

Mr. FINNIE, Swanston, said—I am not aware of anything more deserving the attention of farmers, or, indeed, of any one possessing property in that invaluable animal the horse, than a searching inquiry into the best mode of supplying him with food; and, that once ascertained, economy will follow as a natural and necessary consequence, in one sense, at least; for if the food is given in a manner most likely to insure health and ability to perform work, the large amount of capital invested in that description of live stock runs less risk of being encroached on by death, or unduly deteriorated in value; and the labour, which is the only way of turning that capital to a profitable account, must be admitted to be greater and more secure, in proportion to the uniform health and strength in which the owner of the horse can maintain him. I am at the same time aware that it would not be consistent with profitable practice to lay down specific rules for giving certain quantities of food, and hold out these for general adoption. Under all circumstances, in this, as well as in other departments of farm management, much depends on the nature of the farm and soil—the nature and extent of the work to be performed; and, consequently, the adaptation of the food to the amount of labour must, in a great measure, be left to the skill and attention of the farmer. This, however, I would maintain—that it is essential to successful practice, in this department of rural economy, that a proper and economical system should be in operation. Far be it for me, for one moment, to allege that my brother farmers either want system or economy in the management of their horses; all that I intend by my remarks, on the present occasion, is to lay before this meeting those principles and rules which, in my humble opinion, should form the basis of what may be termed an economical system or mode of feeding farm-horses. The primary and all-important of these, I would state to be, an artificial preparation of the food, and which may be embraced under the following heads:—1st, the cutting or chopping of the fodder; 2nd, the bruising of the grains; 3rd, the boiling or steaming of the roots. Various are the articles which may be used as food for the horse. Take the grains, we have oats, barley, and bran; of the leguminous plants, beans and peas; of the roots, the potato, turnip, carrot, parsnip; and what is used as green food, clover, tares, &c., and even whins; and then the grasses in their dried state, the straw of the cereal grains, and even linseed-cake, linseed, &c.; but upon the present occasion, and for practical purposes, we ought, I think, to confine ourselves to what is produced on the average of farms. Now, in support of my first principle, viz., the artificial preparation of the food, I would say by its adoption

we will be found consulting the laws of Nature, and, by doing so, can never fail in being right. My attention was early directed to this fact, by reading an article (on cooked food for horses) in the *Quarterly Journal of Agriculture* in 1832, from the pen of our able and celebrated professor of veterinary surgery, Mr. Dick, and which it would be well worth while to republish. Mr. Dick very properly calls in question the prevailing indifference on the part of owners of horses to the state in which that animal generally receives his food, describes the peculiarity of the process which his food undergoes, before it passes on to be digested, and, from his knowledge of the anatomy of the horse, argues that an artificial preparation of his food cannot fail to be economical. Mr. Dick concludes thus—“that before the food can properly yield nourishment to the animal, it is necessary that it be minutely broken down and cooked, either naturally or artificially, before digestion can take place; and I further conclude, that the more completely we do this the more readily and completely will the nutritious portions which the food contains be taken into the system; and thus, by avoiding almost the possibility of waste, the animal will be supported in the same condition, at a less cost to the owner.” I think it is unnecessary to add more upon that point, but shall proceed to the practical working out of this theory, and will commence with the fodder—suppose that to be straw—but which I would restrict to that of either beans, oats, or wheat, barley-straw being universally admitted to be bad for horses. Bean-straw I propose not to refer to again, although I believe it to be the most valuable, and even within the scope of my remarks; still, not being a grower of beans, I wish to advance nothing but what is founded on my own experience. Now the article of straw obtains a high relative value in certain localities, and when such is the case, there is less waste by cutting or chopping it; but even take a district where the principal object is to convert it into manure, I would even argue in favour of artificial preparation, having found from experience—1st, that the horse will thus be induced to take a much larger proportion of it within the twenty-four hours; 2nd, that you will afford him some hours during that time of additional rest, to recruit his exhausted system, as, comparatively speaking, he requires almost no time to fill himself; and 3rd, and not the least important consideration, that the more fodder he eats the better will be his condition, for I maintain that any stranger going through a stud of farm-horses will have no difficulty in pointing out to the farmer his best consumers of fodder. But, before passing from the cutting of fodder, there is still another recommendation which I think it has. We all know

that as the winter advances and the spring commences very little of the natural sap remains in the straw; consequently it becomes less palatable, and invariably after wetness in harvest, which we rarely escape from, it is never good, and being one of those that think that hay should to a great extent, if not altogether, supersede the use of straw, where no beans are grown upon the farm, as I am firmly convinced that, give a farm-horse as much of the grains as he can consume, if his fodder is indifferent that animal can never be kept in a thriving state. This may be accomplished by giving hay, provided you use the cutting-machine, but not without it, as I well know the profligate waste that takes place whenever ploughmen have leave granted to frequent the hay-stack. By cutting, however, the farmer can well afford either to give hay alone, or in a certain proportion mixed with the straw, for in either case he will find that less corn will suffice. Then, as to the bruising of the grains; and need I do more than direct attention to the solid excrement of the horse, and its appearance will require no further demonstration to prove that grain given entire produces the loss of a very large proportion of nutrition—some allege a tenth part—I would say much more; but, at all events, a great many grains will be seen voided, without having undergone any change. It is, I think, unnecessary to occupy the time of this meeting with any further remarks on this point, as there cannot be a better illustration of there being an unnecessary expenditure of food, if bruising of the grain is neglected. I shall now refer to the steaming and boiling of the roots—viz., the potatoes and turnips—and perhaps I may be found differing with many of my practical friends, but I will state what my conviction is, and which has been founded on some little experience; and I would say, first, that by boiling or steaming the potato and turnip, there is less risk of endangering the health of the horse; and second, that you maintain him in better condition. I would instance the practice of horse-dealers, whose object is to obtain that condition which is essential to enable them to realize a profit between purchase and sale; and I believe they will admit that either boiling the roots or grains, or steaming the roots, is indispensable to their business; but I would say further, that it is surely more in keeping with the laws of nature, when you subject the system of the horse to what may be termed an artificial treatment, to study the food most congenial for him under such circumstances. And I think it can hardly be disputed, that after exposure to cold, wind, and wet, a comfortable supper of moderately warm cooked turnips and potatoes, well seasoned with salt, is a more inviting and salubrious mess than if they were given in their crude and unprepared state.

Some farmers give two feeds of steamed or boiled roots per day. To that I have no objections. All that I would wish to maintain is, that the horse, during the winter months, should have at least one mess cooked for him in the day; and if it is not found profitable to give either potatoes or turnips, let a boiled feed of peas or beans be substituted, and that at the close of his day's work. Before disposing of my straw-cutting and bruised grain, I may further remark, that Mr. Dick is not my solitary authority. I may point to the practice of our enterprising townsmen, Mr. Croall, to Mr. Isaac Scott, or to the Messrs. Laing. I believe the two former have been found cutting their hay and straw, and bruising their grain, for at least twenty years. I know the former, seventeen years back, had no hesitation in stating that his annual saving in his establishment by doing so was not less than £150. Go to London, and there I find establishments with from 100 to 300 work-horses doing the same. I believe it is very general on the continent. Now, such authority as that I hold to be worthy our imitation and consideration, inasmuch as in such establishments the food is all purchased, and must be obtained, at whatever cost; and the very success of their business depends upon the condition in which they can turn out their horses, and often to the hardest work. I now come to the treatment of horses during the grass season; and here I may be found at variance with other practical men. My opinion, however, is, that the objections to the pasturing of horses are unanswerable. In the first place, I would say it is a most expensive manner of feeding them, inasmuch as less ground would suffice if the grass were cut green, and given either in the stables or yards; secondly, that there is a great waste of manure; and lastly, but not least, the poor animal is turned adrift to roam about and search for his food, with an exhausted system, and is thus deprived of the rest necessary to enable him to perform the requisite labour you extract; and besides, after great exertion and copious perspiration, with a relaxed system, having every pore in his body open, he is left to seek his bed on the cold, and often wet ground, exposed to the elements; and which treatment cannot fail to pre-dispose him to disease; instead of being well groomed—just as important for him as the much-cared for racer—well littered, and allowed to use what otherwise would be an empty stable. There is one thing, however, I should wish to notice in connection with soiling horses, and that is, that, in order to avoid waste, the grass, when cut, should be put into bundles, and let the size and number of those be apportioned, from time to time, to the consumption; as I need not remark that, in proportion to the mixture of clover, its wet or dry state, or the suc-

culency of the ryegrass or tares, will be the ratio for the daily allowance of each horse; and when these are brought home, every ploughman receives the number allotted for him; thus, from the field to the rack, there is no loss in transit. When, on the other hand, it is brought home in a loose state, and each ploughman frequenting the heap, graip or fork in hand, selecting what suits his fancy best, scattering and treading no small portion of the heap, filling his rack to overflowing, and what is not consumed at the time left to ferment until his return to the stable, when it is cast to the dunghill. I have found, from actual experience, that the difference in saving between bundling and bringing home grass in a loose state, amounted to 1s. per head per horse per week; and that, upon an establishment of twenty horses, was no small consideration.

The quantity which each horse may be expected to consume in the course of the day must be left entirely to the judgment of the farmer, as well as the grain and other farm-produce which ought to predominate in the feeding of his horses. I would say, invariably let it be what is of least marketable value. If, during the grass season, the work is light, the grain may be very much restricted, or even dispensed with altogether; and in the winter season, even at regular work, from 10 to 12 lbs. per day, in addition to their cooked feed for supper, will be found sufficient: when hay is given, from 2 to 3 lbs. of less grain will suffice. I find my best fodder eaters consume at the rate of 17 lbs. per twenty-four hours of cut oat-straw—and the saving between giving hay entire and cut will be in favour of the latter in the proportion of a third; and the only point in which I differ from my friend Mr. Dick is, in preferring my oats to be bruised rather than ground, as I think my horses masticate them as well, and certainly appear to like them better. Another point I ought not to omit, and that is, in changing from heavy to light grain, or *vice versa*, the feed should be in proportion to the weight. If this is neglected, overfeeding at one time and underfeeding at another must take place; and it being the usual practice of all farmers to consume all the light oats first, and when they run out to fall back upon the good, and as a difference of 6 to 8 lbs. per bushel is often found to exist, the necessity for this test I think is plainly made out. I shall only trouble you with one other observation, and that likewise bears upon the economy of farm-stable management: it is the undesirableness of trusting the feeding of the horses upon a farm to any one whose employment is that of a regular ploughman, for, without calling in question the honesty of any one in such a situation, I would say, his horses seldom appear in worse condition than

that of the others. This occasions heart-burnings among the other ploughmen: that is not all, there is often favouritism. I likewise object to the system of each man being the custodian of his horses' corn; I do not think economy can exist in either case. My own practice is to intrust one to serve out the grain given to the horses totally unconnected with the ploughmen, and the advantage of doing so rests in having the food of the horses distributed in proportion as they require it. If at easy work, he restricts it; that a regular ploughman is most reluctant to do; and as in every establishment some horses are more easily kept than others in good condition, with this arrangement the food is given in either smaller or larger quantities, as the constitution of the horse, or the nature of the work to be performed, requires. And in this way more thorough control can be exercised over a department in farm management which is certainly not the least expensive to maintain. Mr. Finnie concluded his speech by remarking, that, with regard to the annual expenditure required for the horse, his experience coincided very much with the details given by Mr. Gibson. He would likewise state, that before the disease in the potato crop restricted its cultivation on his farm, he was in the practice of steaming the small or unmarketable potatoes for his horses with a mixture of yellow turnips, in the proportion of two parts of the former to four of the latter. Swedish turnips may be given with advantage in a cooked state alone; but the other varieties will be found too laxative without the proportion of potatoes he had referred to.

The Secretary then read the following paper by Mr. THOMSON, Hangingside, who was unavoidably prevented from attending:—The opinions which have been entertained, and given forth upon this subject, have been numerous and exceedingly varied, while each has been supported by a feasibility of argument sufficient, at least, to induce adoption. Still the matter has not been reduced to anything like a fixed principle. Nor will this be obtained until science enable us to know exactly the property of each ingredient that is commonly used for the purpose of sustaining those animals used in farm work. There are certain general laws of nature which, if carefully considered, may, under close observation and a certain knowledge of the constitution of the horse, guide in common practice; but it is for chemistry to elicit the food best suited to repair the waste produced upon the performance of a given amount of work by any animal employed by man. Experience has pronounced that the food best adapted to enable the horse to perform the greatest amount of severe work is good oats, well-made clover and rye-grass hay, with occasional mashes, and alterative medicine, to keep

the stomach and bowels in proper tone; if this be so, it must be held as the best under all circumstances, and for any sort of work; but as farm-horses are usually kept upon a different description of pace, a corresponding alteration becomes necessary in the amount and kind of the nutritious food given them. The course I have adopted for many years has been as follows:—viz., during the summer months, two feeds of oats per day, of 6 lbs. each, with grass; and during the winter and spring months, the same quantity of oats, with a boiled feed at night, consisting of Swedish turnip, mixed with beans, barley, and clean chaff, weighing 40 lbs., to each horse, using salt and 1½ oz. nitre to each animal once a-week. By this mode of treating my farm-horses disease has hardly been known in my stables. Care should be taken that this quantity of the prepared food should not be exceeded, as it may be considered the maximum to be safely given. Important as is the amount of nutritious food allotted to a horse, not less important is the kind and quality of the fodder that is to be the accompaniment: if possible, the fodder of any year's growth should not be used in the same year; that is to say, the fodder of crop and year 1848 should form the supply over the whole of 1849. At this period of the season, the natural moisture which produces fermentation in the stomach of the horse is exhausted in the crop of 1849, and the animal is saved from those acute attacks arising from disordered bowels which the susceptibility of his system renders him liable to. Barley-straw should never be given to a horse; it is so productive of flatulence that he hardly ever eats it unscathed. As to the question of economy, the food which supplies the largest amount of fat and muscle, torn from a horse by hard work, is the cheapest. Regularity in the treatment of the horse is of the utmost consequence, whether as regards food, drink, work, or mode of keeping and dressing. He is the most easily affected of all the domestic animals by any sudden change, and is more subject to inflammation than any other. He should have but one day in the seven for rest, and as seldom as possible be over-wrought; an extra hour or two will tell upon him for several days. As different horses have different constitutions they require to be treated accordingly. The appearance of the coat speaks at once to the eye, but the state of the bowels is the surest index of the health of the animal. Bruised corn is preferable to whole, both as it obliges the horse to masticate and is more easily digested.

Mr. BLACK, Dalkeith, said—I am afraid that my system of feeding farm-horses will not be approved of by farmers generally, as they may consider it expensive. All the farm-horses under my charge are

allowed 16 lbs. of hay, 12 lbs. of bruised corn, and 28 lbs. of boiled turnips per day, during winter and spring, which, at present prices in my locality, will amount to 1s. 6d. per day. I consider boiled turnips, when given judiciously to cart-horses, a most palatable, nutritious, and gratifying food, particularly to young horses; and not less so to those intended for coach or saddle than for farm-work; they grow much faster, and look much healthier, with nice sleek coats. I have generally from twenty to thirty horses, young and old, fed on boiled turnips; and to convince you that they are wholesome, I have only had one death from disease during the last four years, and that death was occasioned by the bursting of a blood-vessel. I consider it of the greatest importance to keep farm-horses in good condition, or rather fat, as I consider good condition in a farm-horse a good flesh coat. Weight is always advantageous in slow work; indeed, weight is power in the heavy draught. With regard to the remarks my friend Mr. Gibson made at the opening of this discussion, regarding the rearing of horses, I think them most judicious. Great care is necessary in selecting both dam and sire. In selecting a hunting-horse, I believe the first point to be looked at is his hind quarters, to see if he has muscle enough to propel him over the fences; in a roadster, his feet, fore legs, and shoulder; but in selecting a cart-horse, the back-ribs are the first point to be examined, for unless they are high, and well back towards his haunch-bones, he will never be easily kept, or endure much fatigue.

Mr. SCOTT, Craiglockhart, remarked that he very much agreed in the statement made by the gentlemen who had previously spoken; but he did not altogether concur with Mr. Gibson in the opinion that bean-straw should not be given to horses. He (Mr. S.) had long been in the habit of giving that kind of food, and he was aware that others had; and his opinion was, that its value was not much inferior to hay. He had also found much advantage when horses were working hard, especially in the spring, to adopt a judicious plan of a division of the food. The interval, he considered, was too long for a horse to want food, from an early hour in the morning to twelve o'clock; and a small feed of oats at about eight o'clock he found was valuable to the animal.

Professor DICK remarked that he was not prepared to enter at length upon the subject now before the meeting, as he was not present at the commencement of the discussion; but, from what he had heard, he thought he could gather pretty accurately the opinions of the farmers as to the feeding of their farm-horses. There was one point, however, which had been but incidentally touched upon, and to which he would suggest that more attention

should be paid. He alluded to the giving of food to horses at shorter intervals. He approved of cooking food, but the danger lay in giving it in too large quantities at a time. In the evening, when the animal's system was somewhat exhausted, and the cooked food was easily swallowed, the stomach became overloaded, and every farmer well knew the consequence. Food ought to be given in the morning before going out, and again, as had been recommended, at eight o'clock. Indeed, a greater division of food would at all times be found advantageous. He knew one gentleman who had lost a number of horses by inattention to this, and though he was generally sent for, he always found the animal dead before he got to the place. He suggested an alteration in the way of feeding the horses, especially that the evening meal should be divided into two feeds, instead of being given all at once. When the animal came in from its work one portion could be given, and the second portion some time after. He did not think that the gentleman referred to lost a single horse afterwards, except on one occasion when a servant gave one of the animals a too large feed. He would also mention the advantage of allowing a horse to rest twice during the day at least. It was most injurious to a horse to allow it to work on for a number of consecutive hours without food. The stomach of the animal was small, consequently it could not contain food sufficient to enable it to work a great portion of a day without a renewal of food and rest. Sometimes the stomach was literally stuffed full, and its power of contracting and acting on the contents was thus destroyed. In consequence of the peculiar structure of the animal, the stomach soon became empty, and when distended, either with food

or was in want of it, it was much injured. A combination of hay and oats chiefly would be found the best kind of food—though some thought it expensive—and to cut the hay and bruise the oats was much to be recommended. If the corn be bruised or ground it could be taken with safety, for it would be deprived of its vitality by either mode of treatment, and thus digestion be quickened. Mr. Thomson recommended hay and oats, with a little bran-mash, as the best feeding, and in this he was right, but he added to this the propriety of giving a little alterative medicine. He was one who was more in the habit of giving medicine than in taking it, and he would advise Mr. Thomson to try a handful of salt among his horses' food instead of any *alterative medicine*. No doubt, an alterative medicine would make an alteration, but what kind of alteration? It would be found that any interference with the profession of the regular practitioner was by no means a good thing for the farmer. When medicine was really necessary, let the farmer send for the doctor in *time*; let him give small quantities of salt amongst the food, but let him have little to do with alterative medicines. All kinds of medicine were alterative; but he would have his farmer friends to have more faith in a handful of salt, and good food, judiciously given, than in quack alterative medicines, which were so plentifully advertised. He had that day had some cake sent him as being good food for horses, and suited to their strength; but he had no specimen of it with him. He might observe that a certain quantity of innutritious food was necessary to go along with the other, because, if the food be too rich or nutritious, the animal would assuredly suffer.—*Highland Society's Transactions.*

ON THE PECULIARITIES OF THE MANAGEMENT OF FARMS.

The peculiarities of the management of particular farms in a district, is one of the most instructive of all agricultural investigations; and we have often urged attention, both to our own remarks upon individual cases, and the pamphlets or reports of others upon them, not only because they are indicative of practices both to pursue and to shun, but because they are a sort of indicator of the agricultural tone of the district in which they occur. The now defunct Society for the Diffusion of Useful Knowledge, which once published a "Farmer's Series," took this view; and, a volume of reports on "Select Farms," which passed, we believe, under the immediate eye of the late lamented Earl Spencer, were amongst the most interesting of the

works they published during their brief existence. Since then, the Royal Agricultural Society has taken up local agriculture in its reports on the state of farming in the different counties; and many of them—all the most valuable—contain an account of the general features of the agriculture of a district, and, then, as exceptions, any peculiarity of farming pursued by individual cultivators in it.

Good cultivation in a district is the aggregate of good farmers prevailing; and these are set to work and stimulated in it, by the efforts of some one or two leading characters, who, whether their own particular speculation answers or not, are of vast benefit to the community around them.

We are led to these remarks from having before

us a considerable pamphlet* by a gentleman well-known as one of the active directors of the venerable Highland and Agricultural Society of Scotland; we mean David Milne, Esq., of Milnegraden, whose visits to some South of England farmers he has reported for the benefit of the Berwickshire Farmers' Club, and which the club did themselves the credit at once to print and circulate amongst their members, with a view of promoting the object Mr. Milne had in view—namely, to induce the adoption in Berwickshire of such parts of these systems as were applicable to the locality. Two of the farms he visited have had so much public attention for a long period, that they have been fully discussed; but the first enumerated—that of Mr. Rigden, of Hove, near Brighton, in the county of Sussex, situate near the sea-coast, on the chalk formation—is less known, and therefore we shall venture to call our readers' attention to it in the first instance.

Chalk farming, we may venture to observe, however, is peculiar. It requires peculiar management, is effected in a way essentially its own, by external agents, and is not liable to those pestiferous weeds which so prevail on the higher-lying portions of the red-sandstone formation; and being porous moreover, is generally independent of drainage. But the whole county selected is, as Mr. Milne states, below par in farming—the produce being supposed to be 26 bushels per acre of wheat. Mr. Farncombe, in his report on this district, in his Essay on the Farming of Sussex, speaks of the great tracts of uncultivated down, and states that “thousands of acres on these downs I believe may be profitably cultivated, which produce now little but heath and furze!” Mr. Rigden's is one of these heath farms so cultivated. Mr. Rigden's farm lies exposed to the sea—shelving down towards it, and faces the S.W. This Mr. Milne names as unfavourable, and to a certain extent it may be so; but it must also be borne in mind that the S.W. winds of a Sussex coast are very different in their effects from the N.E. winds of the Berwickshire, or even of Durham or Yorkshire; he derives not, however, the compensating advantage which some celebrated “high farmers” do of the phosphorus and potash of the marine shells and algæ, and therefore has more merit in his farming. The great principle adopted by Mr. Rigden appears to us to be his depending upon green crops and stock as a paying element, rather than on mere corn, as is too generally the case. The following is his expenditure on a 750-acre farm:—

Rent.....	£1,300
Enough, we imagine, especially with a lease.	
Taxes.....	150
Moderate.	
Tradesmen's bills.....	353
Rather heavy.	
Sundries, losses, &c.	100
Wages.....	1,690
Full in amount, especially when labour is cheap.	
Purchased manures.....	686
Upwards of 18s. per acre on the whole farm.	
Grains, for feeding.....	100
Milk is sold off to compensate for this.	
Seed.....	150

Total..... £4,529

Or an expenditure per annum of £6 per acre.

It must be borne in mind, however, that the circumstances of the farm appear to be very special, for straw, potatoes, clover, tares, rye, and even hay are sold off the farm (what the amount is we are not informed, nor is it perhaps fair we should be, though it was stated to the members of the Berwickshire Farmer's Club). But the value Mr. Milne gives in the gross at

£9 per acre, on an average, or.....	£6,050
Outlay as above.....	4,529
Average profit, from which must be deducted interest of capital, wear and tear, house-keeping, personal expenses, &c.	£1,521

This sum appears enormously large; but the produce is also large, and its nearness to Brighton will (to a farmer selling off the produce) not only make a large sum, but place him quite out of comparison with the ordinary run of farmers. The following is his produce, per acre (English): Wheat, 36 bushels; barley, 40; oats, 60 to 80; mangold wurzel, 30 tons; white turnips, 20; clover, 2; potatoes, 150 to 300 bushels. These are large crops; but so much does he make of green crops that he sometimes gets two of these and one of corn off the farm in two years. This, to a green-crop seller is everything. In two seasons he will have three crops, thus: Tares, rape, and rye, sown in autumn after corn, eaten off in April; mangolds, turnips, or potatoes sown in May; and in the autumn, when these are eaten off, the wheat follows.

He must not be supposed as selling all the produce of his farm, however, as his list of stock will show at a glance; viz:—

350 Southdown ewes.	
20 „ rams.	
150 Teggs, or female lambs one year old.	
21 Milk cows.	
12 Heifers of different ages.	
28 Farm horses.	

The ewes are fed on turnips and rye, mangolds and cabbage, and are sheltered when near lambing in sheds, and littered with straw. The cows are house kept, turned out only two hours per day for exercise, and are brushed and curried daily; and six are sold off fat annually. The horses are fed on hay, carrots, wheat chaff, and pea haulm, and con-

* Report of a Visit to the Farms of Mr. Rigden, Sussex; Rev. Mr. Huxtable, Dorset; Mr. Morton, Gloucestershire: with Remarks on Agricultural Improvement. By David Milne, Esq., of Milnegraden, Berwick-upon-Tweed: “Warder” Office, pp. 63.

sume all the oats grown on the farm, from 3,600 to 4,800 bushels per annum, which, divided by 28, would give some 171 bushels per horse per annum. The stated quantity is two bushels per horse per week, and the same of carrots. Seven of these horses are kept continually conveying crops to Brighton, and bringing back manure: well up to 1,000 waggon-loads of stable manure, and the same quantity of night-soil are annually brought to the farm. The purchases of artificial manure, besides, are some £43 per annum.

This farm is essentially peculiar. It only sets out with a principle which we wish to press very earnestly upon the agriculturists at the present day; viz., to urge them to *depend more on stock and green crops and less upon corn for rents*. Mr. Milne has displayed a master-hand at bringing out the material points in the system; and no person wishing for the elements of investigating the system pursued can fail of obtaining all reasonable information from the report.—Gardeners' and Farmers' Journal.

A FEW DAYS IN LANCASHIRE.

It is pleasing to observe the growing inclination which exists on the part of intelligent farmers to move about, and make themselves acquainted with the various systems and practices which prevail in different parts of the country. The cheapness and rapidity of travelling at the present day afford unwonted facilities for such visits, and there can be little doubt that their frequency will operate for good. When an agriculturist from a well-cultivated county goes into a district where the cultivation is indifferent, those with whom he may come into contact have a chance of profiting by his observations; and, on the other hand, if he visits a district in which the farming is superior to that to which he has been accustomed, he can scarcely keep his eyes open without deriving benefit from what he sees. Even in those places where agriculture is farthest behind, something may occasionally be learned, if the observer be divested of prejudice. And, in a social point of view, much advantage is sure to result from the inhabitants of distant parts of the country intermingling with each other. In this respect, steam is gradually effecting a social revolution, by wearing out old illiberal notions, and promoting, instead, feelings of kindness and good-will.

We have already on several occasions given a few notes of what came under our observation during visits to Lancashire. We recently made a short stay in the northern division of that county; and, though our excursion this time was neither from motives of pleasure nor agricultural inquiry, we give a few impressions from memory, in the hope that they may prove interesting to our readers. Our observations were principally confined to the country around Lancaster.

AGRICULTURE OF THE DISTRICT.

Lancashire has the reputation of being the worst farmed county between London and the Scottish border, and there are portions of it which well deserve this unenviable fame. In the eastern parts

we are assured that it is by no means an unfrequent practice to break up a lea field, take a crop or two of oats, and afterwards, as they say, lay it down to rest without sowing a handful of grass or clover seeds of any description upon the land! In the central districts around Bolton, Wigan, and Chorley, the cultivation, though not so barbarous as this, is slovenly in the extreme; and it will require well-directed and long-sustained efforts on the part of the proprietors of the land to effect any decided improvement. In the northern division of the county the farming is much better, and in the detached district to the north of Morecambe Bay, it is of an advanced description, approximating in many respects to the best parts of Northumberland, with the great drawback, however, that around Furness, where the best farming is to be seen, there is still a great extent of bare fallows, even on the best turnip soils.

Around Lancaster a large proportion of the soil is remarkably fine. Indeed, the vale of the Lune—above and below the town—can scarcely be surpassed for natural fertility. The old pasture fields have a rich verdant hue, which we may look for in vain in the best cultivated parts of Scotland at this season of the year. The country is principally devoted to dairy husbandry; and where there is such a fine natural growth of grass, we are convinced that the proprietors are right in preventing the old pastures from being broken up by tenants who have not the requisite skill and capital for carrying on a more advanced system. The land lies mostly on an open subsoil, and is therefore comparatively dry; but drainage is generally requisite for sure turnip cultivation. A proportion of each farm is kept as meadow, and is manured on the surface with dung at intervals of two, three, or four years. Another part of the farm is kept in constant cultivation. This is obviously the weak point of the system, and we cannot avoid the conclusion that the landlords might, without much

difficulty, effect an improvement on such a practice. In many instances the arable land is managed without any regard to a regular rotation, and such a practice is safe only with skilled farmers. It is not unusual to take wheat after fallow, following with barley sown with red clover. Now, on open growthy land, however clean the fallow may have been, there is sure to be foulness on sowing out when two successive cereal crops are taken. On a few much better managed farms which we have seen the arable land is thrown into a regular four-course of turnips or fallow, wheat, clover, oats; but though this is immeasurably superior to the common practice, there is the danger that the land will tire of growing red clover when it is repeated so frequently; and, besides, the soil and climate are so admirably adapted for the growth of grass, that it seems to us sufficiently obvious that a mixed system of the convertible farming, such as is commonly practised in Ayrshire, and the dairy husbandry with the old pastures, but to a rather less extent than heretofore, would be a great improvement. For instance, on a farm where there is at present forty statute acres under cultivation, it might be extended to sixty, by breaking up twenty acres of the worst of the old pasture and meadow land, and throwing it into a six-course of oats after lea, turnips, wheat sown with a mixture of seeds, hay, and two years of pasture. A portion of the hay might be cut green for house-feeding either in severe or warm weather—a most desirable object on dairy farms. A five years' course with, say, fifty acres, by taking out the hay, and simply pasturing on the fourth and fifth years' would also do; but a greater extent of old meadow would require to be kept than by the other rotation, and there is the risk that the heavy short-horned cows of the district would be apt to poach the land in the early part of a soft season in the fourth year of the course, when it might be requisite to put them on during wet weather, in order to keep the early grasses from running to seed. But with either of these methods we are satisfied that earlier pasture would be obtained for the cows, more grass would be grown on the farm, and the arable land would not only produce better crops, but also incur less risk of becoming exhausted. A partial, perhaps a complete, substitute for the wasteful practice of spreading dung upon the meadows might be found by carefully collecting the liquid manure of the farm-yard, and applying it instead. We have frequently observed manure laid upon the meadows in August; but, even when it is more judiciously applied during winter, the temperature is often high enough to induce fermentation, and consequently to cause a loss by the exhalation of ammonia.

The extensive tract of flat land between the mouths of the Lune and the Ribble is all arable, with the exception of a considerable extent of unreclaimed moss; and under the name of the Fylde country, is well known as a fine wheat-growing district. Here also the wheat is grown after a season of bare fallow, and after potatoes—the few turnips are followed by barley. Of late years farmers have been very successful in the growth of sound potatoes on portions of reclaimed moss. Some of them can tell far more marvellous stories of the acreable value of the produce than anything we have heard about Auchness; but, judging from appearance, they will not be so fortunate this year. On driving through part of the moss of Pilling on Friday last, we observed with regret, that the foliage was everywhere much blackened; the appearance, indeed, was little superior to what we see on light lands in the neighbourhood of Ayr. Sound potatoes have been so valuable for several years, that even a very moderate crop must have been profitable with the cheap method of cultivation on the moss of Pilling. When we came through it last year on the 30th April, on field after field the decayed haulm of the previous crop and a few inches of the dry moss on the surface were raked into small heaps; to these fire was put, and for miles around there was a stifling atmosphere of smoke. In this easy manner a manure was obtained, by spreading the ashes, and another crop put in at a trifling expense.

The dearth of labour, and the scarcity of active skilled farm-workers, must be a serious obstacle in the way of good arable farming in Lancashire. With us the thinning and hand-hoeing of turnips is all done by women and boys, at a wage of ninepence or tenpence per day; in Lancashire we see men whose daily labour costs two shillings, stooping over the hoe and handling it in a very inexpert manner. So many females are employed in the mills that scarcely any can be got for field-work, save in hay time, when a few turn out at eighteenpence a day. The difference in cost is thus very great. While we have turnips twice gone through and well cleaned for six shillings per statute acre, they cannot do it much under twenty shillings. The cost of every description of farm-work is greater than with us, though not in the same proportion. Reaping, which is here performed for from seven to eight shillings an acre, costs there from ten to twelve. And these matters cannot be much mended by hiring a number of young men, giving them victuals and lodging in the house. A Scotch farmer would sicken at the interminable cookery which would be necessary in such a case. Only think of five meals in the day; and these prepared in a nicer manner than the Scottish labourer

thinks of. We would not have the reader to infer from this that the English labourer eats a greater quantity than the Scotch; but the greater frequency of his times of eating, and the more delicate manner in which his food must be prepared, cause a very different amount of work. The cookery in the kitchens of our farmers would appear to their English neighbours as very homely indeed. Our farmers possess a treasure in the frugal habits, the persevering industry, and the intelligent zeal for the interest of their employers which our cottars and other farm-labourers usually manifest; but these qualities cannot be fully appreciated until they know a little about the peasantry in other parts of the world.

CHEESE-MAKING IN LANCASHIRE.

Great quantities of excellent cheeses are made from the stocks on the old pastures of North Lancashire. The principal difference between their method of cheese-making and ours is, that they put the rennet into the milk in a colder state, and salt the cheese by steeping it in brine after it is made, instead of mixing it with the curd, as in Ayrshire. The latter practice of the Lancashire maker is, we believe, a necessary consequence of the former. The practice in our dairies, where cheese-making takes place once a day, is to take the cream from the milk of the previous evening, and then heat it to a degree which brings both it and the cream to the temperature of new milk. In Lancashire we are told that the evening milk is added in a cold state, and a greater weight of curd is thus obtained. It appears to us that by this plan it must be more difficult to separate the whey from the curd; and we have seen many Lancashire cheeses which were faulty in this respect, but not so many as to satisfy us that it is a general characteristic of them. The steeping in brine, instead of mixing the salt with the curd, has a tendency to prevent the cheeses which are thus cold thickened from flattening after they are laid out. They are kept in the brine from seven to ten days, according to the opinions of different makers. The brine is strong enough to carry an egg, and there is enough of it put into the vessel containing the cheese to come up round the sides, but not to cover the top, which is overlaid with salt. If seven days is the length of time during which the steeping is to continue, there are seven vessels used. One cheese is removed and laid on the shelf every morning, and the others are each removed one vessel forward, with the reverse side up, and a new cheese is put into the first vessel. The action of the brine for such a length of time forms an indurated crust upon the cheese, and effectually prevents its losing its proper shape after it is laid upon the shelf.

RECLAMATION OF LAND FROM THE SEA.

We are not acquainted with any district in which so much may be done in the way of gaining land from the sea. Between the mouths of the Wyre and the Lune, there are thousands of acres on Cockerham Sands which are dry at neap tides, and on the north side of the Lune there are sixty to seventy thousand acres of Morecambe Bay, which the ordinary tides cover to an inconsiderable depth. A few years ago a railway was proposed to be carried across the bay to Ulverstone, by which forty-six thousand acres would have been laid dry, but the direct line to Carlisle was preferred. The improvement of shutting out the sea, by means of a dyke, from such an extensive surface, seems to us quite a feasible undertaking, when we reflect on the magnitude of many of the works which are accomplished at present. The question of profit has only to be satisfactorily established, and English capital and enterprise will soon carry out the project. If an arid surface of sharp sand only were obtained, which would require many years of patient labour to render it productive, there would be little inducement to attempt a work of such magnitude; but when it is recollected that the sand of the bay is mixed with sludge so replete with phosphates that the farmers about Thurnham cart it out as a manure to their wheat crops, the affair has altogether a very different aspect. If the sea were dyked out, the whole surface that is thus laid dry would at once become a rich wheat soil; and we hope the time is not far distant when a vast extent of the coast, over which the tide now flows, will be waving with yellow grain, or delightfully verdant with luxuriant crops of Italian rye-grass and Swedish turnips. Mr. Dawson, of Aldcliffe Hall has, by means of a dyke, shut out the tide from one hundred and sixty-six acres of land on the estuary of the Lune below Lancaster. We had the pleasure of going over this land last week with the intelligent proprietor, and of seeing the fine crops of wheat, oats, and beans which are raised upon it. The ground, though drained, is not sufficiently dry; but in other respects we have not seen a more fertile wheat soil. This is very encouraging to farther efforts. But a work of such importance as the reclamation of the sands of Morecambe Bay is properly a national undertaking, and we believe that the sands are claimed by the government. The successful completion of such a work would be a great national boon; but, in the first place, such questions as these must be answered—How much will it cost? and how far is it likely to be profitable?—Ayr Advertiser.

BARLEY CULTIVATION ON STRONG SOILS.

We beg to call the attention of our readers to the following paper:—

Of all the different occupations in which the busy part of mankind employ their time, talents, and capital, that of a farmer is by far the most difficult. The tradesman may, by long observation and experience, learn to transact his business almost mechanically, and by the aid of the most improved machinery which he has at his command, be enabled, almost without his own manual interference, to manufacture the most complicated pieces of mechanism, and the finest fabrics of cloth, for which our countrymen are justly celebrated all over the world. With the farmer it is quite different: he has not only to combat with the elements, should they prove unpropitious during the time when he is in hopes of being rewarded for his toil and trouble by a plentiful harvest, or at a time when he wants to deposit his seed in the ground for another crop, and all the routine of a farmer's life, which consists chiefly of out-door employments; but he has also to struggle with the changes which are daily taking place in the very structure of the soil which he occupies, and on which he is dependent for a livelihood. True, observation and experience may enable the farmer to do a great deal which he otherwise could not; but then his experience, which in one instance has been of benefit to him, may in the next instance be a total failure; in other words, the plans he has adopted in one particular instance, in order to secure a plentiful crop, may in the next instance prove a total failure, or at least not repay him for his expenditure. The land on which a few years since he was enabled to grow a fair average crop of wheat, by being continually cropped in one particular method, becomes as it were satiated of it, and refuses to mature any tolerable quantity of the crop fit for the sickle. The strong clay lands in the North Riding of Yorkshire have been chiefly cultivated on the system of fallow, then wheat, oats, then fallow again, with rarely any intervening crop in the majority of instances, so that they have become, as it were, sick of the rotation. Beans have been tried in lieu of the oat crop, but there being such an uncertainty as to their success has made most parties rather unwilling to try the experiment, at least on a large scale. There is also another objection to beans on cold clayey soils: that is, as to whether they will ever be got fit for the market, by reason of this kind of soil not bringing them soon enough to

maturity to enable the farmer to have them housed before the winter sets in. Several intelligent farmers have begun to see the uselessness of sowing beans on this description of soil by the ordinary methods, and have adopted a different mode of treatment; and as far as we have been able to judge, with decided success attending their operations.

The land is fallowed in the usual manner during the summer months, and by repeated ploughing and harrowing is freed from all the weeds that may have accumulated in it during the course of time it has been in corn in preceding years. During the month of October it is liberally supplied with good rotten farm-yard manure, at the rate of about 10 or 12 loads to the acre, carefully spread by women or boys in as even a manner as possible, so as not to leave lumps in one place and another quite bare. It should have been stated that before the manure is carted on, the ploughman proceeds with his plough and a pair of horses abreast down the ridge of every land, and throws open a furrow; he then returns with his near-side horse in the furrow, which he has thrown open, and throws another the other way, in the same manner as in doing what is technically called "taking up a furrow." When this is done, he proceeds to the next, and so on until the whole is finished. The carter then turns his horses, with their load of manure, down the furrow which the ploughman has opened, which, besides being of use for a purpose we shall hereafter explain, serves as a track for them, down which they proceed with the greatest steadiness, saving the expense of a driver, and leaving the carter at liberty to distribute the manure as equally as possible over the land, after which it is beat into smaller pieces, in the manner before described.

The ploughman now proceeds to ridge up the land in the following manner:—The horses are yoked to the plough in a line, to preclude the undue trampling of the soil, and proceed to turn back the furrow before opened: and here we see the utility of the plan of throwing open the ridges. Instead of an unshapely ridge, like the back of a lean horse, it is neatly rounded, and does not contain more than its proper quantum of manure, which it would do had it been treated in any other manner than the one we have just described. The advantage of having the horses in a line is not only to prevent poaching of the land in general, and securing steadiness of draught,

but also in clearing out the last furrow the near-side horse does not trample the new-ploughed land, which should be kept as free from indentations of this kind as possible, for during the winter months the holes made by the horses' feet on this kind of soil hold the water as effectually as a dish; nor does the objection of loss of draught by two horses in a line apply in this case, for one horse might almost take up the last furrow without assistance.

The field is left in the ploughed state during the winter, and as soon as possible in the spring slightly harrowed, and then ploughed over to destroy the few remaining weeds that may have sprung up. It should then have a top-dressing of guano, at the rate of 2 cwt. to the acre, and then be harrowed and drilled with barley, $2\frac{1}{2}$ bush. to the acre, and afterwards harrowed well to get a fine surface. We observed some crops in 1848 and 1849, and likewise in this year, which had been treated in the manner we have just described, that were really beautiful. Had there been no other indications, the observer could not have supposed that the land where such crops of barley as those grew could be strong clay—and yet such was the fact. The average yield on one farm where this plan was adopted was 52 bushels per acre of good marketable barley, which was mostly bought by the maltsters in the neighbourhood, and a beautiful sample it was, and commanded as good a price as the grain grown on the so-called "turnip and barley" soil. There is very little, if any, thrashed yet of this year's growth; but from the appearance of the growing crops, they bid fair to equal, if not to excel, those of former years.

After the grain has sprung to the height of a few inches, the land is sown with a mixture of red clover-seeds and Italian rye-grass, at the rate of about 12lbs. to the acre, which soon germinate and, as soon as the barley is removed, grow vigorously, and prove a most excellent crop. It is mowed either as green food for the horses in the ensuing summer, or made into hay and chopped as food for the live stock on the farm. The after-grass should be allowed to have a tolerable growth, and then not eaten too near before the ley is ploughed out for wheat in the ensuing autumn.

The clover ley should be ploughed out ten days or a fortnight before it is intended to be sown down, in order to get pulverized by exposure to the atmosphere, and then well harrowed, and the wheat drilled in at the rate of $2\frac{1}{2}$ bushels to the acre, the rows 8 inches apart.

The wheat crop by this mode proves much better than by the ordinary mode of sowing wheat after fallow. A crop of clover is secured, which amply repays the farmer for his trouble and expense, and he has also obtained a crop of barley which is worth treble the money the crop would have been had the land been sown with oats. The soil is in better condition; there is a greater quantity of straw to be converted into manure; and on the whole the system is much to be preferred to the old method of "daubing" a seeding of wheat into a naked fallow in the autumn.

HORDEUM.

Oct. 3rd, 1850.

—Gardeners' and Farmers' Journal.

DEEP OR SHALLOW DRAINS.

SIR,—If the answer in my last be the true logical one to the question, arguing upon theoretical grounds, then the next point to be ascertained is—are we acquainted with any facts which would practically show that it would be imprudent to adopt a system of drainage which most nearly approaches the perfect filtration, as exhibited in the lecture-room?

I know of no fact which would lead to such a conclusion, but there is one well known to every one, which appears to me to prove practically the reverse, and to establish a perfect union between theory and practice on this important question; giving ocular demonstration that the best system of drainage is that which most nearly approaches perfect filtration. I use the term "most nearly approaches," for, of course, it would not be possible,

economically speaking, to make drains so close as to be a perfect filter.

I allude to the well-known fact that, whether in crop or grass, the soil exactly over the drain produces in greater abundance, and of better quality, than the remainder of the field. Now, the soil over the drain is as near as possible perfectly filtrated, and is, therefore, capable of absorbing all the important elements of the manure supplied by the hand of man, or from natural causes.

If this reasoning be, as I think, conclusive in favour of making our drains approach as near as possible perfect filtration, then it follows as a certainty, that shallow drains near together are better than deep drains at double or treble the distance; for it would be mere quibbling to contend that deep drains, if put as close together as the

shallow drains, would better effect the purpose—because the expense would practically render such an operation impossible.

Although I have here alluded to only one branch of this most important subject, yet I believe that the other, which may be termed the mechanical operation, would, if fairly discussed, be also in favour of shallow draining; but, without entering into this, I trust enough has been said on the chemical properties which drains impart to the soil, to induce those who have applied for the government drainage money, to pause before they decide upon making deep drains.

To avoid misrepresentation I would merely observe that by the term shallow drains, I mean drains sufficiently deep as not to be disturbed by agricultural operations—say, from two to three feet, according to the character of the subsoil—a more important element, even, than the soil, in deciding this question—and by deep drains, those of from three feet to four and five feet deep, and upwards.

I am, Sir, &c.,

RIGBY WASON.

Corwar, Sept. 16, 1850.

—Ayr Advertiser.

PLOUGHING-IN GREEN CROPS VERSUS FEEDING OFF.

SIR,—It is yet a common notion that herbivorous animals have some distinct and peculiar mode of action upon the various constituents of their food, by which those parts expelled as excretæ are rendered more fit for the food of plants than could be the original food, rotted or decomposed in any other way. It is also ordinarily received that the deposits of a number of animals fed upon an acre of any green crop, will be more beneficial to the land than an acre of the same crop, ploughed in and properly decomposed in the land.

In my lectures, for some years past, I have endeavoured to combat these opinions, but as they are still retained in some quarters, I intend in this letter to repeat my arguments, and to give instances where *practice* has proved the truth of theoretical deductions. I shall not here argue as to the amount of profit or loss attached to either mode of proceeding, as it in fact must always depend upon conditions, of which the farmer is the best judge. Nor shall I attempt to prove that, under all possible circumstances, to plough-in a green crop will give a greater produce than to feed it off. For in cases of exceedingly light lands, the mechanical action of the treading of the feet of the sheep might more than counterbalance the loss of manure by the feeding. What I assert, however, is, that under general circumstances, in ordinary soils, the ploughing-in of any green crop, and its subsequent decomposition in the soil, will give more manure to that soil than if the crop had been fed off; and that the effect of this greater amount of manure will be seen in the subsequent crops. The arguments in proof may be stated as follow:—

Firstly: It is well established that animals in breathing, give back more to the air than they derive from it. They receive nitrogen and oxygen, and return them again, *plus* a certain excess of nitrogen, carbonic acid, and aqueous vapour. Animals also transmit to the air much in insensible and sensible perspiration.

Secondly: The experiments of Boussingault and others have shown that the liquid and solid excrements of animals weigh less than the food from which they have been derived, and that as regards the food, excretæ are deficient in *nitrogen*, carbon, and hydrogen.

Thirdly: It is well known that animals consume a considerable portion of the farinaceous and oleaginous portions of their food for the production of *animal heat*, and that the greater portion of the excess is laid up in the form of fat; that of the nitrogenous portion, part is consumed by the voluntary and involuntary motions of the muscles, and part forms fresh flesh for the growing animal. Of the inorganic matters of the food, a portion is required for the formation of bone. It is therefore quite clear that there must be much less manuring matter in the excrements than in the food, of which they are merely the unconsumed remains—the *ashes*.

Fourthly: It is known that animal and vegetable substances are composed of the same original elements; that all animal particles have first had vegetable life; that though the proximate changes and combinations of their elements are almost innumerable, yet, that the results of the ultimate decomposition of animal and vegetable matters in contact with air are the same.

Fifthly: To sum up: If, as it has been proved, the excretæ of animals weigh less than the food they have eaten; if there is a diminution of the most valuable of the ingredients in passing through the animal; and if, in their ultimate decomposition, the food and the excretæ give the same products, it follows that the matters resulting from the decomposition of the original food will be *greatest in quantity and richest in quality*.

But practical experiments are, in this instance, so easily made, that I should be wrong if I omitted to mention some of the numerous facts which experimentally prove the truth of my assertions. Mr. W. Trumper of Dorney near Windsor, Mr. Oakley of Rochester, and others, have forwarded me the results of trials made on their respective farms. Mr. Trumper, in a field of rape part fed off by sheep, and the other ploughed-in, found in the succeeding wheat crop a difference of a quarter per acre in favour of ploughing-in. I insert letters from some other gentlemen who have also found favourable results.

LETTER I.

MY DEAR SIR,—In reply to your letter, I am instructed to

say that the members of the Farmers' Moon Club, in the neighbourhood of Rochester, Kent, unanimously agree that vegetable manures are peculiarly fructifying, and that, taking the case of a fallow or other field, being all previously of the same tilth, and sown with rape for feeding, and divided into three divisions, one of which shall be fed off with sheep without any extra food to the rape, the second division ploughed in, and the third division fed off with oilcake or corn; that the worst corn succeeding the rape will be on the first division, the next best on the second, and the best on the third. Thus all speak in favour of green crop for manure.

Yours truly,

JOHN OAKLEY, Old Broad-street.

August 10, 1849.

J. C. Nesbit, Esq.

Members of the club:—

Jno. Stunt, Gillingham	Jno. Walter, Upchurch
Ambrose Spong, Frindsbury	W. Walter, Rainham
Jno. Baker, Cooling	Cs. Smart, Gravesend
J. H. Solomon, Sherne	R. Cobb, Higham
W. Eley, Frindsbury	Jno. Oakley, Darland
W. Lake, Chalk	

One member deficient by a late death.

LETTER II.

Naseby, May 15, 1849.

MY DEAR SIR,—I regret I was not at home to answer your inquiry sooner, having been in Yorkshire the last fortnight; however, I hasten to send you the required information. In the spring of 1846 I had more turnips than my stock could consume; I therefore thought that it was reasonable that, if the crop was broken to pieces and ploughed in, the grain crop that followed would derive as much benefit as if eaten by sheep. I therefore did so with one acre on the first week in February, and with another upon the fourth week in March. Part of the rest of the field was eaten on the land, and part being newly ploughed up land, the whole crop was drawn off.

On the land where the turnips (white rounds) were broken and ploughed in on the last week in February, the produce was 84 bushels per acre of Hopetown oats.

Where the turnips were broken and ploughed in on the fourth week in March, the produce was 74½ bushels per acre.

Where eaten on the land by sheep, 70¼ bushels per acre;

And on the newly-ploughed up land, the whole of the crop drawn off, 41 bushels of wheat.

I am, yours faithfully,

J. C. Nesbit, Esq.

PETER LOVE.

LETTER III.

Assington Moors, June 15, 1849.

DEAR SIR,—I have just seen Mr. Underwood, who was a neighbour of mine eighteen years ago, but is removed to a distance. He says he has practised ploughing in a few acres of turnips almost every year for upwards of twenty years, and considers three sacks of barley per acre quite within bounds, as the increase from ploughing-in over feeding-off. The clover is much better; but he has not observed the wheat sufficiently to say what the difference is. He estimates an average acre of white turnips to be worth 30s. more to chop and plough-in, any time before they begin to run to seed (say February out), than to feed off.

I inspected a field of wheat this week belonging to John Gurdon, Esq., which was white turnips three

years back; a part was ploughed in, and the rest fed off with sheep, and half-a-pound of oilcake per day each given to them. The wheat, where the turnips were ploughed in, is decidedly better than the rest; I think three bushels per acre. Mr. Hudson, the steward, told me the barley was quite a foot higher than the rest of the field, and three sacks per acre, if not more, better. The clover was all fed off, and no notice taken; nor would anything more have been thought about it had not the wheat looked so much better than the rest all the spring. The turnips were about three-quarters of a plant but regular; the sheep went down with the epidemic, and were sold, leaving about two acres of turnips to feed; and rather than purchase any more stock they were ploughed in.

As I told you at the club, I am generally a buyer of turnips; but the obstinacy of my neighbour, Mr. Underwood, who refused to take 20s. per acre for his to feed off (for the sake of convenience to me) when almost everybody else were giving theirs away, attracted my attention to the after crop; and I can, in two instances, confirm his statements. Notwithstanding if 1½ cwt. of swedes (I think a ton of Swede turnips will make 14 lbs. of mutton, from experiments I have tried) or 2 cwt. of white turnips will make 1 lb. of mutton, and we can grow 21 tons of the former and 26 or 28 of the latter, it must be more profitable to feed at 5d. per lb. for the mutton than to plough in to gain 30s. or 40s. per acre in the corn crop.

I have been unwell, and could not see the parties, or I should have answered your note before.

I am, dear Sir, very sincerely yours,

Mr. J. C. Nesbit.

THOS. HAWKINS.

If these results are found incapable of convincing our sceptical friends, they must have ensconced themselves behind a barrier of ignorance and prejudice impenetrable to the shafts of reason.

It may be necessary to say, that in ploughing-in a green crop for manure, great care is necessary in choosing a suitable time, and that it be not allowed, by too long growth, to become fibrous, so as to delay its decomposition in the soil. For turnips, February or early in March is quite late enough, and the best effect is seen where they have been touched by the frost.

It is scarcely needful to say that the arguments advanced do not apply to sheep fed on turnips with oilcake, unless an amount of oilcake equivalent to that consumed by the sheep in one instance were ploughed-in with the turnips in the other.

In conclusion, I reiterate that my object has been, not to prove that *ploughing-in* is profitable, in comparison with *feeding off*; but rather to elicit a principle which, if once known and understood, may, on many occasions, as when stock is dear, and green crops abundant, be brought into beneficial and profitable practice.

I remain, sir, yours very truly,

J. C. NESBIT.

*Scientific and Agricultural School, Kennington,
London.—Sept. 14th, 1850.*

ABSORBENT POWER OF SOILS.

Resuming our remarks on the remarkable power possessed by some soils to absorb certain materials calculated to afford food to plants, and holding these materials by some power hitherto unexplained: The cause of this phenomenon is quite unexplained. Professor Way seems to have satisfied himself that it is not due to any ordinary chemical power possessed by our known chemical agents. A chemical agency might arrest a portion of a substance in its passage, and share the proportions between the soil which it passes through and the water passing through it, and so diminish the salt contained in the latter; but, contrary to this, the salts formed in the soil by this process of extraction are insoluble in pure water. To capillary attraction also, or the power of minute vessels to hold matters which come in contact with them, the Professor satisfies himself also it cannot be due; and therefore it must remain for the present unexplained how or by what power the soil possesses the capability of detaining materials passed through it.

There is, however, a remarkable and noticeable change in the water which has given up one of its salts: it becomes charged with another. It may be remembered that Mr. Thompson's soil contained, after filtration, in the one case four grains of gypsum, and in the other case one grain of gypsum; and therefore it appears that the sulphuric acid of the sulphate of ammonia he had applied had left the ammonia, and attached itself to the lime. His other experiments were also of a similar description.

Thus, in another experiment, there were 6·3 grains of sulphate of lime;

In another	1	grain
"	5·8	"
"	0·8	"
"	1·0	"

So that the experiments may be said to be quite uniform as to the fact of the water exchanging in the soil the ammonia it contains for the lime it appeared to have the power to abstract.

Mr. Thompson does not give us the analysis of the soil he used, but Mr. Way gives an analysis of Mr. Pusey's soil, which appears to have been in a very worn-out and enfeebled state, and might therefore, as that gentleman not inaptly suggests, have more power of absorption than ordinarily well-formed soils. 100 parts contained:

Water	20·56
Vegetable matter.....	6·17
Sand and clay	59·00
Phosphoric acid	—
Carbonate of lime	5·94
Magnesia	—
Oxide of iron and alumina..	7·90
Potash	0·31
Soda.....	0·12
	100·00

During the course of the experiment, common salt was substituted for ammonia, and it was abundantly proved that the soil possessed but little power to detain the salt, and that the effects of the two were as different as possible. Mr. Way went also further. He tested the resulting liquid after filtration, and found that in most cases the water so obtained contained *lime* in some of its forms, generally as the base of the acid which had previously formed the salt of ammonia applied. Thus, when sulphate of ammonia was applied, he had sulphate of lime; when nitrate of ammonia was applied, he had nitrate of lime; when muriate of ammonia, he had muriate of lime; and so of the rest. Nor was absorption or detention restricted to the ammonia in its various forms, for one of which the soil seemed to possess as much facility of detention as another; neither did a very long period seem to be necessary to effect this extraordinary change. Thus he contrived a tube twenty-four inches in length, and, having partly filled it with soil, so arranged the apparatus as to force out the ammonia through it with a syringe. The solution passed through in two minutes, and yet the resulting liquid was perfectly free from ammonia. In a fourth repetition of the experiment, when dried soil was used, the ammoniacal liquid was employed, and in about *eight seconds* was completely deprived of its ammonia which was detained in the soil. Potash was substituted in the experiments, and the same power, to a certain extent, appeared to be evident. Caustic potash, carbonate of potash, and nitrate of potash, are all subject to the same wonderful detaining power. Phosphoric acid was next tried, and the result was that the same remarkable tendency was developed. So far as a general rule the process must have washed out or chemically deprived the soil of its lime; but it is equally remarkable that the soil also possesses the power to detain lime itself in a similar way. Lime-water was poured on a mixture of white pottery clay and sand, and, though a considerable quan-

tity of liquid passed through, no lime whatever appeared either free or in combination ; and in other experiments on different subsoil clays a great portion of the lime was arrested. The analysis of the clay experimented upon is thus given, and the professor has distinguished the materials soluble in acids and insoluble in them as follows :—

	Insoluble in Acids.	Soluble in Acids.
Water of combustion	—	6.15
Silica	42.28	18.73
Alumina	11.45	12.15
Oxide of iron	3.53	2.11
Lime	0.55	0.27
Magnesia	0.22	0.29
Potash	—	0.86
Soda	—	1.41
	53.03	41.97
Total.....	100.	

Now it appeared that this clay possessed by very far greater power to arrest the materials passing through the soil, and it appeared in the course

of the experiments that sand in itself possessed the power to absorb the materials in a much smaller degree.

The effect of burning the soil also seemed very much to arrest its power of absorption ; and the different degrees in which soils will absorb the manurial ingredients seems to be, in relation to some partly mechanical and partly chemical power which is exercised in relation to the material contained in the test, in the proportion in which the soil is destitute of that particular material. That it is a powerful agent may be readily inferred from its breaking down the affinity by which muriatic acid, sulphuric acid, and nitric acid will hold their bases, and still will give up another material of which it may have a satisfying quantity. Its range, moreover, of salts appear to be limited, and the degree of absorption limited also ; but it is remarkable, as regards the former, that it holds those best which are most needed by the plants, and those least which are of less consequence. And its power of absorption by very far exceeds the quantity of any dressing ever given to the soil by the farmer. —Gardeners' and Farmers' Journal.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

PUSEY FURZE, BERKS, March.

Between four and five miles north of the Faringdon-road station on the Great Western Railway, is situated the estate of Mr. Pusey, M.P. for Berks. The prominent position held by this gentleman in our agricultural literature, and the many aids he has given by his writings to the general diffusion of enlightened agricultural practice, determined us not to pass through Berkshire without a brief description of the system of farming followed by him. The outline of the country, and the soil of which it is composed, are eminently favourable to economical and remunerative farming. Large open level fields, sufficiently sheltered by lofty timber to break the rigours of winter and to afford a shade from the heats of summer, offer a refreshing landscape to the eye of the practical farmer. No rocks or stones obstruct the operations of his implements, but a fine dry easy-working soil presents to him a "raw material" on which his skill, capital, and enterprise may be embarked with every reasonable hope of success.

There are several varieties of soil on Mr. Pusey's farm, which contains between 300 and 400 acres, part of it being stone brash, part fine loam, and part an inferior and somewhat moory soil, mingled with peat. The first two are excellent corn and turnip land, the last is being chiefly devoted to water meadow. The breeding and feeding of sheep is the point on which everything else on this farm is made to hinge, and large quantities of artificial food are bought in order to increase the capacity of the farm for sheep, of which there has been for the last year a very large stock kept. Corn crops, consisting of wheat, barley, and oats, are taken alter-

nately with green crops, which are consumed on the ground. No clover or seeds are sown, as the water meadows, which will be afterwards described, supply all the summer feed that is considered requisite. As soon as the corn is removed, the stubble and a thin surface are turned over by Glover's skim plough, with which implement (said to be a most efficient one) two horses can go over two acres a day. This is well knocked about by the harrows, and white turnips are then drilled in, on the flat, with 2 to 3 cwt. of superphosphate. Another part is sown with winter vetches and other spring feed. These are eaten on the ground, and followed by swedes and mangold, the former of which are also eaten on the ground, the latter drawn home for consumption in the yards. The swedes are manured with 3 cwt. of superphosphate per acre, and sometimes yard dung also, in which case they are sown on ridges, wherein the manure has been previously laid and covered ; and this mode of mixed manuring, both dung and superphosphate, invariably brings the best crop. As the swedes are eaten off, the land is either lightly ploughed, and the wheat, barley, or oats, as it may be, drilled in with Hornsby's drill, drawn by four horses, and covered by one stroke of the harrows, or it is breast-ploughed by men, about one inch in depth, at a cost of 5s. per acre, and the seed then drilled in and covered as before. This last is considered the best operation, as offering the firmest and surest seed bed for the wheat. For barley and oats the land is lightly ploughed. All the corn crops are sown in rows, and hoed by Garrett's horse-hoe. The land being in constant tillage and highly manured, it is very clean and free from weeds.

The sheep stock kept on the farm averages 800 in number, the half of which are breeding ewes. During winter they are folded regularly over the rape, turnips, and swedes, the ewes getting no other food except hay-chaff. The "tegs" receive a little rape-cake and barley besides, the quantity being gradually increased to three-quarters of a pound of the former and a pint of the latter daily to each, for six weeks or two months before they are sent off fat to London. Rape-cake is given by Mr. Pusey as, in his opinion, the cheapest description, when compared with its fattening efficacy. As soon as the "tegs" are ready they are shorn before being sent to market. When the winter food is consumed the sheep are folded on the water meadows, on which the whole stock is kept for five months in summer. 20 to 24 oxen are purchased annually, more for the purpose of making the straw into manure than anything else. They are kept in a yard with an open shed, in which each is tied up to a stake to be fed three times a day, being loosed again as soon as they finish their bait. That consists at present of 7lb. of oil-cake and a peck of barley-meal, mixed with hay-chaff for each animal, and cannot cost less than 10s. a week, exclusive of attendance. They get no roots or green food whatever, but are allowed to wallow among straw. At the bottom of the yard the stream for irrigating the meadows passes through, supplying water to the cattle, and carrying off the liquid of the yard to enrich the meadows.

These water-meadows form the great feature of Mr. Pusey's management. He introduced the system two or three years ago from Devonshire, having entered into a contract for laying out an experimental portion with an experienced irrigator from that county. The whole cost of levelling the ground, making the gutters, and the further charge for carriers to bring the water from the brook to the meadow, was £5 10s. an acre. The first year the experiment proved a total failure, in one case the ground seemed positively injured, but this arose from the water having extirpated the moss which previously overspread the meadow. It was suggested that the failure arose from the poverty and low condition of the land, and it was noticed that on a portion where some burnt ashes had been spread the action of the water had produced a luxuriant growth. Next spring, therefore, the whole meadow got a dressing of burnt peat ashes. The water now had its full effect, and so great was the growth produced, that one meadow, 20 acres in extent, was fed four times with a flock of sheep during the summer, the water being let on to the ground immediately after the fold was removed, thus washing down to the roots of the grass the whole enriching substance before there was time for it to be lost by evaporation in the heat of the sun. This meadow afforded keep to a flock of 400 sheep for five months of summer, and Mr. Pusey states that a smaller one, of two acres, yielded keep for 73 sheep, or 36 sheep on one acre, for five months. But we are bound to say that some of the neighbouring farmers allege that the sheep were *hept*, but not *fed*, and that it was marvellous in their eyes how Mr. Pusey had managed to keep so many sheep even alive on this small space during the whole summer. So

well satisfied is Mr. Pusey himself with the results of irrigation that he is extending his meadows on his own farm, and, it is said, intends to lay one out for each of his tenants, where the necessary supply of water can be found. On his own farm he has no other summer keep, as he now dispenses altogether with laying any part of his arable farm into clover or seeds. As this experiment has proved so successful in one of the drier counties of England, it may be useful to mention that a detailed account of the whole, by Mr. Pusey, is to be found in the 24th number of the *Journal of the Royal Agricultural Society*.

The benefit which Mr. Pusey does to the district around him, by introducing new agricultural implements, is readily recognized by the farmers, who profit by adopting those which he finds successful, while they, of course, avoid his failures. Hornsby's drill, Garrett's horse-hoe, Glover's skim plough, are among the most efficient of these. But in regard to the system of farming he adopts, or rather, as they say, his want of system, it is so irregular that they cannot comprehend it; and whilst they readily admit the great increase of sheep stock now kept on the farm, and the larger annual produce in corn, they say that that is gained at a greater cost of artificial food and manure than it is worth. This we think is very unlikely; but it might be worth Mr. Pusey's consideration so to systematize his management as that it would be readily understood by his neighbours: and we would add that he should not be content with a mode of feeding oxen which *must* entail loss, besides a great waste of straw, when there can be no doubt that a judicious mixture of roots with the more expensive food, corn and cake, given to house-fed cattle, might be adopted with a profitable result, and a much more economical consumption of straw. With the improved farming now carried on, we were informed that Mr. Pusey has quadrupled the sheep stock and doubled the corn annually maintained and produced, as compared with those of the tenant who previously occupied the farm.

Labourers are here paid 8s. a week, working nine hours a day. Cottage rents are 1s. a week, and each labourer has an allotment of a quarter of an acre of excellent land adjoining his cottage, let to him at the rate of 40s. an acre, which the land would readily bring from a renting farmer. The soil is so easily wrought that three, and occasionally four, pair of horses and a yoke of oxen are found sufficient for Mr. Pusey's farm of between 300 and 400 acres; but the usual depth of furrow in ploughing does not exceed three inches, and nearly the whole green crops are consumed on the ground where they grow. Horses are fed on hay and two bushels of oats a week to each.

The surrounding country is of very much the same description of land as that occupied by Mr. Pusey. The rent and rates amount on an average to 30s. an acre. The four-course husbandry is the rule of the district, and in many instances it is carried out with much skill and spirit. The details are very similar to those described by us as practised in the southern division of Oxfordshire, though we think the farming on the whole is not so good as in that part of the country. In many instances

turnips are not cut for the sheep, nor is the system of winter green crops so diligently pursued. Twenty-eight to thirty bushels of wheat an acre may be reckoned an average crop. Towards the Vale of the Isis the land becomes very stiff and worthless, "too strong for cultivation, and too weak to carry crops," as we were informed. Adjoining this tract is a deep sandy loam and a light sand, and each farm generally contains a proportion of all, so that the bad is kept going with the good. This division of land likewise gives rise to a mixed system, the farmers having a portion under dairy, as well as sheep and corn. The fall in prices has, therefore, not so much affected them, the dairy still continuing to bring in regular returns. Farms are never let by tender. Poor-rates are said to have increased in some parishes from 2s. 6d. (a few years ago) to 4s. per pound. Labourers' wages are from 7s. to 8s. a week, and cottage rents £2 10s. to £3. Twelve horses are requisite for the cultivation of a 400-acre arable farm managed in the four-field course. Chalk is not used in this part of the county, as the distance is considered too great to fetch it. Turnips are frequently destroyed in winter by rapid changes from frost to thaw, and it is somewhat singular that the warmest parts of the county suffer more from this than the more exposed—the northern side of the Wantage hills, for instance, where the frost is more intense, but, by its aspect, protected from the effects of the sun. Excellent Southdown sheep and Berkshire pigs are bred in this part of the county.

Eastward from Wantage is a tract of very fertile corn and bean land, not too strong for swedes and other green crops. Corn and leguminous crops here follow each other in succession; very little stock is kept, the farmer's sole dependence having hitherto been on corn. The country is open, there are no fences along the public roads, and none dividing the different kinds of crop. Rent in some cases reaches 40s. an acre, while the tithe, which is greatly complained of, is as high as 12s. and 15s. an acre, and the poor and other rates about 5s. per pound more. The land seemed to be cleanly, but not richly farmed. The farmers are busy sowing peas, a variety called the blue pea, said to be excellent for boiling, being sown at the rate of four bushels an acre. They are put in by a one-horse drill, in rows about a foot apart, the machine (which has been long in use in the country) acting like a light plough with a seed-box fixed to it, the seed falling into the rut just as it is made, and being covered by the crumbling mould which falls in of itself upon it.

Quitting this tract, we get again on the chalk downs round Ilsey, which are of superior quality. Labourers' wages were here lowered last week from 8s. to 7s. Cottage rents are 1s. to 1s. 3d. a week. The land is cultivated on the four-course system, with some variations peculiar to this place, barley being taken after clover lea, and wheat following turnips and rape, which are eaten off early. About a tenth part of the farm is kept under sainfoin, in which it remains for four years, being each year cut for hay, of which it gives an excellent crop. A farmer having 40 acres of sainfoin, sows out 10 acres and breaks up 10 acres annually. This goes

regularly over the whole farm, the sainfoin not returning on the same field for considerable intervals; and when its turn comes round, the field receives a rest of four years from the routine of cultivation. It is ploughed up in spring, and sown with oats on one furrow, the crop of which is generally excellent, as much as 80 bushels an acre not being unfrequent. The average yield of wheat on the better class of down land here is 30 bushels, and of barley 40 to 48 bushels. On a farm of 380 acres a stock of 300 ewes is kept, and their produce fattened off, the farm maintaining about 700 sheep during the year. This is very much greater than we found common on the down lands of Dorset or Wilts. But here all the beans and peas, and part of the barley, grown on this farm are "spent" in feeding the stock. Artificial manure is not used to a great extent. The rent, tithe, and rates, are about 30s. an acre. In one parish here the land is "common field," one farmer's fields being intermixed with another's, to the obvious increase of expense in management. One consequence to which this leads is, that a man who farms much better than another, expending more capital and getting his land into higher condition, reasonably objects to an enclosure and new distribution of land, as he must suffer in being compelled to take what is out of condition in lieu of that which he has at so much cost put into condition. The rector of the parish in the case referred to has between 50 and 60 acres of land, which he cultivates on his own account, scattered in 50 different places among the fields of his parishioners, through any of which he has of course right of access.

Farms in Berkshire are generally held from year to year. The farm buildings are old and insufficient, though there are, of course, many exceptions to this. Some farmers have abundance of capital, but it is too common here, as in other parts of the country, for farmers to take farms too large for the means at their disposal. Compensation for unexhausted improvements, it was urged, would tend to prevent this by the greater capital in hand which an entering tenant would then be obliged to be possessed of. And the fact that the landlord would be liable in the first instance for this claim would, it was thought, prevent him giving a tenant notice to quit except on grave necessity. The want of such right is felt as a great bar to the free investment of tenants' capital and the full cultivation of the soil. The arbitrary exaction of the income-tax is another grievance much dwelt upon. Corn rents are advocated by some. Two years' notice, with compensation for unexhausted improvements, are regarded by others as better than a lease. The malt-tax was not much complained of. There can be no doubt that in many parts of this county farmers are diminishing their expenditure, and that the small country tradesmen are now suffering on that account. Labourers on the whole are considered to be better off than before. The rate of wages in Berkshire contrasted favourably with some other counties we have lately been in, while the rent of cottages is moderate. In many parts of the county the execution of drainage and other permanent improvements affords employment. On the estate of Mr. Walter, of Bearwood, which we visited, an ex-

tensive system of drainage was going on, and very substantial farm-buildings were being erected. Mr. Wheble, of Bullmershe, is also actively engaged in improvements, though his operations are not in so forward a state as to justify us in offering an opinion on them. The uses to which machinery is here applied are very various and ingenious. In the erection of farm-buildings we may remark that it is important they should not be executed on a scale more expensive than is requisite for the purpose in view, as in that case the interest of the outlay becomes a permanent dead weight which can never be remunerative. And we think it also injudicious to erect costly buildings (as we have seen instances in this county), for the use of farmers who are unable, from want of capital or want of skill, to turn them to a profitable account.

REIGATE, March.

The county of Surrey is described by the agricultural portion of its inhabitants as being, to use Cobbett's expression, "on the sunny side of London." How far this is synonymous with increased intelligence in the development of its natural resources, and of those advantages which proximity to the best market in the kingdom affords, we leave to be ascertained from the following facts elicited by us in the course of our inquiries. The county possesses very considerable varieties of soil, which lead to a corresponding diversity in the systems of cultivation pursued. To enter on a minute description of these would complicate our narrative, and render it impossible to give a clear and comprehensive statement of what we have heard and seen. We therefore think it best to pursue that division of the subject which the route we adopted and the localities we visited suggest—merely observing at the outset that we endeavoured to concentrate our attention upon those districts, the geological features and position of which appeared to mark them out as most likely to form the centres of agriculture in the county. Entering Surrey from the south-eastern extremity of Berkshire, we were first attracted towards Guildford, in the immediate neighbourhood of which extended beds of plastic and London clay, chalk, and green sand. These formations brought thus closely together give to the district a considerable variety of aspect, and to the soil an equal diversity of quality. Sometimes the traveller finds himself in deep lanes, guarded by lofty trees, which remind him of Devonshire. Shortly after he may be standing on bare uplands, which recall the impressions of Dorset scenery; and again he is surrounded by rich woodlands, which, with their long-extended perspectives, bring back to his mind the landscapes of Berkshire or Hants. The soil varies so considerably that it is no unusual thing for farmers to adopt totally different systems of management in contiguous fields—sheep-folding being practised on one piece of land, and being considered impossible on that immediately adjoining it. There is some very fine and some very indifferent soil about Guildford; but, taken as a whole, it must be looked upon as a district peculiarly adapted for successful cultivation, and the rent may be considered as

very moderate, averaging about 30s. an acre, including outgoings. Farming, however, seems to be carried on with very little spirit in the great majority of cases. Except upon the chalk, the fields are small, and intersected by hedgerows crowded with elm trees. Where drainage has been attempted it has generally been so close to the surface, and so inadequate in other respects, as to be of little benefit to the land. The farm-buildings are usually constructed of wood and thatch, and are as inferior as any thing of the kind we have yet seen. Indeed, generally, the broad features of neglect and mismanagement, of a low scale of intelligence, and a small amount of capital and industry in the cultivation of the soil, are very observable around Guildford. There was, however, one portion of this district which struck us with special astonishment. The denizens of the metropolis, if in quest of rural scenery, untouched by the hand of modern improvement, need not journey for it to the remote parts of the kingdom. An hour and a-half's ride from London will set him down at the Gompal station of the Reigate and Guildford railway, where a short half-hour's walk on the road to Abinger will exhibit to him as completely neglected a state of rural industry as he is likely to meet with in the remotest parts of the island. He will there see undrained marshes, ill-kept roads, untrimmed hedges, rickety farm-buildings, shabby-looking cows of various breeds, dirty cottages—nothing, indeed, exhibiting care or attention, excepting covered drains from the farm-yards, which rather ostentatiously discharge the richest part of the manure into the open ditches by the wayside. This last evidence of painstaking waste is not confined to the neighbourhood of Gompal, being found by us wherever we went in the county.

From Reigate we extended our inquiries south into that great tract of wealden clays, which occupies large portions of Surrey, Sussex, and Kent, and about which it was predicted that in the event of free trade being carried it must go out of cultivation. We found the land still under cultivation, though the occupants were suffering severely from the pressure of the times. And it is no wonder that they do suffer. The weald clay would exhaust the patience and the resources of far more substantial men than those who now farm it. It is stiff and tenacious, refusing to be disintegrated by the plough, and soaked with an accumulation of moisture, which alone is ruinous to vegetation. The face of the country possesses few distinctive features, being wooded, but not very richly, and possessing no great variety of outline. The hedgerows are very numerous, wide, and high; so unchecked are they in growth that for long distances they completely shut out the surrounding scenery. A more difficult field for the labours of the agriculturist can hardly be imagined than this weald country; and the natural barriers to its improvement are greatly increased by the method in which it has hitherto been farmed, and the order of things which has gradually arisen under the sanction of time, and taken deep root in the soil. The farms are of from 50 to 200 acres in extent, and are let, at from 5s. to 15s. rent per acre, to a class of men whose families have been located on the

ground for many generations, and who have so little improved in intelligence or otherwise under that lengthened occupancy that many of them were told can with difficulty sign their own names. The landlords of the weald are described as frequently anxious to set on foot drainage and other permanent improvements, but they have almost always been frustrated by the prejudices of their tenants. Whether these prejudices will much longer withstand the new influences and necessities to which our agriculture has been subjected—whether the class who entertain them will be able to resist the present pressure, are questions on which we do not venture to give an opinion; but it is certain that many are just now two years' rent in arrear, and that they are all every day becoming less and less able to encounter that heavy outlay in improved cultivation which can alone render farming profitable on the weald.

A great variety of practice exists throughout Surrey with reference to the terms on which farms are let. They are principally held from year to year, but leases also exist to a considerable extent, and are usually of seven or fourteen years' duration. The landowners do not appear to object to leases in all cases where tenancies from year to year exist, and instances came within our observation where the occupants might have had leases if they wished. The reasons stated for not asking leases were chiefly confidence in their landlords, uncertainty as to the results of a free-trade policy, and a preference for yearly holdings, arising out of custom and the practical security of possession, which was found to be coincident therewith. Most of the large farmers appeared to hold on lease. Along with this mixed characteristic of the principal feature in the relations between landlord and tenant, there has grown up in Surrey, by custom, a practice in the nature of that "compensation for unexhausted improvements," of which we have heard so much said in other counties. This practice appears to mean that the outgoing tenant should be paid a full valuation for dressings and half-dressings of dung and lime and sheep-foldings, and for ploughings and fallows, including the rent and taxes of the fallows, half-fallows, and lays. Seed sown with the spring-corn, the underwoods down to the stem, hay and straw at a feeding price (the hay and straw being at a market price where the half-dressings are not paid for), are all included in the valuation, which is settled by two valuers or their umpire. This practice is described by Mr. Robert Clutton, a land agent in Surrey, as "promoting an extensive system of fraud and falsehood among the farmers;" and he explains that the mischief arises principally in "the half-dressings;" that is, those manurings from which only one crop of corn has been taken. Mr. Clutton says, in his evidence on the subject, before a parliamentary committee which sat in 1848, and of which Mr. Pusey was chairman:

"Where manure has been put on at a distance of time, it is exceedingly difficult to check the quantity or quality of the dressings; and we find that very false returns are made of it, both in respect to quantity and quality. Outgoing tenants 'work up to a quitting,' that is, they work out the

farm, and put in inferior manure, in order to receive payment for it as if it were of good quality. Having been so imposed upon in starting, they feel justified in playing the same tricks upon quitting. There is not much difficulty in ascertaining the value of the manure while it is in the yard, but there is a great deal of difficulty in ascertaining its value after it has been carried out and mixed with the soil. Even when no crop has been taken this is the case, and the difficulty is increased, of course, with half-dressings. A disposition has arisen among the tenantry to lessen their payments in this respect by getting their landlord to buy up the dressings and half-dressings. I have found that appraisers are appointed by farmers to go over their farms and tell them how to make a high valuation, and this has been found practically to limit the choice of tenants and to lock up their capital. The tendency in Surrey has been to lower the rent of farms, as compared with other parts of England, and to have the same money paid for bad as for good farming."

Such is the evidence given by an experienced land agent on the evil effects of the custom in Surrey as to compensation for unexhausted improvements. It will be observed that Mr. Clutton's objections apply to the way in which the custom is exercised rather than to the principle on which it is founded, and that he says nothing which contravenes the justice of that principle, provided it could be reduced to practice. The result of our inquiries has certainly been confirmatory of Mr. Clutton's views as to the evil consequences of the custom, and its tendency to demoralize the conduct of farmers in their relations with their landlords and with each other. In this respect we were particularly struck with the number of land-valuers who, in every part of the county, have established a business founded on this system. The most intelligent farmers we conversed with deprecated the increase of this class as equally injurious to the owner and the occupier of the soil. Their position, it was said, naturally led them to prey upon that capital, already too small in amount, which was prepared for investment in the land; while their numbers, and the facilities which their occupation gave them, had indirectly the effect of throwing landlords into the hands of agents, who interposed between them and their tenants, bearing the brunt of odium when it arose, and shutting out that personal inspection and those appeals to individual responsibility which can never be neglected by a proprietor who aspires to do his duty.

The neighbourhood of Guildford supplies various examples of husbandry. The clay lands on the hill sides in many cases still undergo the process of naked fallow, tile drainage not yet having been so extensively adopted as its importance on such soils renders necessary. On the chalk lands the usual husbandry described in other counties is here adopted; but, as the farms seldom exceed 500 acres, and generally run from 200 to 300, more care and minute attention to details secure better returns. Oilcake is used for feeding the stock to some extent, and artificial manures for increasing the green crops; so that the returns of wheat may be reckoned on the average at nearly 28 bushels,

and of barley 40 bushels, while the average of sheep stock is $1\frac{1}{2}$ per acre. On the sides of the valley sloping to the Wey the operations of the farmer are much impeded by small enclosures and hedgerow timber, though on all sides indications are here afforded that on this point landlords are now giving way. Generally speaking, these sloping fields are greatly injured by water, and there did not appear to be much draining going on. The style of agriculture is, therefore, very defective, when the quality of the soil and the conveniences of the situation are taken into account. Along the Wey the land is a deep sandy loam, much of it in pasture, but much also under tillage. The first appearance of many of the winter fallows, the paltry green crops, and the old-fashioned plans of ploughing so generally adhered to, indicate a very backward state of husbandry, while the state of the farm-roads and farm-buildings is in perfect keeping with the implements and the stock. Draining is here followed to some extent on most farms, but very seldom does there seem to be proper accommodation provided for the milch cows or their produce. Proceeding from Guildford to Dorking, we pass along a picturesque road, hills rising on either hand, wooded along their summits and with frequent hedge-rows dividing their sunny slopes; large sombre yew trees in great numbers, interspersed through the fields, giving a peculiar aspect to the scene. At Albury we turned into the farmyard of Mr. Drummond, M.P., of whose agricultural improvements we had heard at Guildford. The buildings are constructed somewhat on Mr. Huxtable's plan, all the animals being stall-fed and placed upon boards. Covered houses for dung, and tanks for storing the liquid, are provided. The houses were in good order, and the animals seemed to be very healthy and thriving; but we should fear that in the heat of summer the houses, which present an enormous surface of dull black roofing, would be unwholesomely warm. We would venture to suggest to Mr. Drummond that he should try the effects of a thin lining of thatch straw (which Mr. Huxtable finds the best equalizer of temperature), or even a good coating of whitewash, which would reflect instead of absorbing the piercing rays of the Surrey sun. The soil here is a light sand, wearing, probably, its best aspect at this season, as it must be very subject to injury by drought in summer.

In the neighbourhood of Reigate, along the valley, the land is of a friable texture, fairly cultivated in some instances, but not, in any one that came under our observation, with that energy and skill which are to be met with in districts of the country which have very few of the advantages enjoyed by this. Four and five horses are frequently used in a plough. The plough itself is of very antiquated construction. As illustrating the prejudices of some of the farmers, we were told of an instance in which a farmer coming here from a "two-horse country," introduced the two-horse plough, continued to use it for 30 years, turning over on an average an acre a-day; and yet his neighbours on both sides of him at the end of that long probation still insist that it is impossible to plough land with only two horses! The course of

husbandry followed, where any is adhered to, is the four-field; but we were assured on very competent authority—that of an intelligent farmer long resident in the district—that the ordinary farmers have no plan, but usually decide as to the next crop of a particular field according to the opinion of one or two neighbours at their weekly consultations in the alehouse on market-days. The stock kept on the different farms varies with the character of each, some rearing early lambs for the London market, some keeping also a few cattle, and some dairying. On one farm we found a butter dairy of 40 cows, from which the farmer derived a larger and less fluctuating return than from any other branch of his business. In this case, however, the cows are not suffered to stand exposed among filth and wet in an open yard, the farmer having, in default of his landlord making the fair and necessary outlay, built substantial cowhouses at his own cost. In these the cows are fed in stalls, each animal receiving, besides hay, three-fourths of a bushel of brewers' grains and a supply of mangold daily; and it may be instructive to the dairy farmers of the south-western counties, who despair of producing a marketable article with such feeding, to know that the butter produced on this farm is supplied by contract to one of the first hotels in Brighton and to another in London, the tastes of the frequenters of which are likely to be sufficiently fastidious. The contract price is 1s. 4d. per pound in winter, and 1s. 2d. in summer. Here, within a distance of some 20 miles of London, with railway accommodation if they choose, with a soil and climate adapted for the production of the earliest vegetables of every kind for the use of the table, we found the system followed exactly what it might have been if the farms were distant 500 miles from the metropolis, and with a necessity, therefore, to convert everything the farm produced into the least bulky form for cheap transit, by which a ton weight might carry the produce of two acres of wheat, and the whole green crop of the farm be packed up and borne to market in the living bodies of the sheep stock.

That portion of the weald which we have examined in Surrey is for the most part a stiff wet clay, becoming at intervals more loamy and friable, and rising in some instances to good stock and green crop farms. Being naturally very difficult to manage profitably, it has under the present management for a series of years been gradually deteriorating; and, while it yields scarcely subsistence to the cultivator, it affords a scanty rent to the owner, and a niggard supply of work to the labourer. The system of cultivation is begun by a bare summer fallow, the ground being as carefully managed as its undrained state admits, and then dunged with such manure as the farm produces, and limed, if the farmer can afford the expense. The wheat is then sown, the field being ploughed in "lands," so as to admit the horses in drawing the harrows to pass up the open furrows without trampling the rest of the land. The crop reaped after this preparation varies from 12 to 20 bushels an acre. Four or five crops then follow, according to the taste of the cultivator, whose study now is how at the least expense to get from the soil the

different qualities it may have imbibed or accumulated during the year of bare fallow. When these are clearly ascertained to be thoroughly exhausted the land is again bare fallowed. Scarcely any stock worth mentioning is kept on these farms. The implements used are of the rudest kind, the barn implements in an especial degree, the use of the common barn winnowing machine being frequently unknown. Its place is supplied by sacks nailed to four horizontal slides, which are fixed on a pivot at both ends, and, when turned briskly round get up a breeze of wind in which the corn is riddled by hand, and the chaff blown away. Under such a system it is quite impossible that this land can long continue in cultivation. The first improvement necessary is thorough drainage, and after that is accomplished we should expect much assistance in the further development of its resources by the facilities of communication afforded by the several lines of railway which travers it. We should anticipate much benefit to the texture of the soil by heavy applications of chalk, which might be brought along the line from the nearest chalk cuttings; and if the railway companies would co-operate with the farmer, it might be worth his while to bring down from London large quantities of the cheapest manure—coal ashes and street sweepings, to be laid on in heavy doses, in the hope that by this management the soil might gradually be rendered friable and suitable for the production of green crops as well as corn. This no doubt contemplates much outlay of capital; but when regard is had to the impossibility of things going on as they are at present, and to the advantages this tract enjoys in being little more than an hour distant from London, we think the experiment in good hands would probably prove successful. This soil, if dry, and if its texture can be altered so as to admit of being kept clean under constant tillage, possesses a strength and depth of staple which could not be easily exhausted.

Labourers' wages in Surrey are from 9s. to 10s. Taskwork is very common, and 12s. a-week is

often earned. Cottage rents are high, varying from 1s. 6d. to 3s. 6d. a-week, with very little garden ground. The cottages on farms are sometimes held by the labourers direct from the landlord, in others they go with the farm. Beer is generally given in hay and harvest, but there is no rule on the subject. Many farmers are reverting to the custom of keeping the farm servants more in the farmhouse, the low price of corn and meat rendering this the cheapest plan they can now adopt. Besides the facilities afforded by railways they have likewise exercised a very beneficial influence on the "rates" of the parishes through which they pass. Poor rates and highway-rates in some parishes are, from this cause, extremely moderate.

The chief complaint among the farmers themselves, apart from that of low prices, was the heavy burden of the tithe. The unfair character of some of the payments claimed by the outgoing tenant from his successor, which have already been referred to, was also mentioned as a heavy tax on a farmer's capital. One fact arising from this "tenant-right" in Surrey is that there is less competition for farms and a more moderate scale of rent than we have met with in other counties; but we are bound to add that these advantages have not contributed to better cultivation, as we should have anticipated. We found it made the subject of much complaint in this county that the relations between the owner and the occupier of the soil were of so distant and broken a character—that the former had so frequently placed between him and his tenant a man bound in a measure to close the avenues of free communication, and by his situation interested in making his principal forget that, of all human occupations, there is none which requires for its successful and creditable performance more strict attention to business, a sounder judgment, and a more enlightened and liberal course of action, than that of a man who holds a great estate, in the free enjoyment of which he is secured by the laws of his country.

(To be continued.)

REPORT OF THE INSPECTORS OF THE PENWORTHAM AGRICULTURAL SOCIETY.

Mr. BURNET read the following report and list of prizes:—

Gentlemen,—We, the undersigned inspectors of the various farms and crops competing for the premiums offered by your society, beg to lay before you the following remarks as the result of our labours. And first as regards the best cultivated farm of more than fifty statute acres in extent. For this premium we have inspected three farms, the cultivation of each of which entitles its occupier to very considerable merit. Mr. Edward Bridge, however, we consider worthy of the greatest commendation, not only for the general good management of his farm, but for the very spirited and judicious improvements he has effected within the last

four years. Mr. Bridge's farm contains 160 statute acres. The soil on some parts is a good clay loam. There is a portion of water meadow land, and the remainder is reclaimed moss land. It is cultivated as follows, viz.:—54 acres in pasture; 38 acres in meadow; 21 acres wheat, after potatoes and beans; 16 acres oats; 12 acres potatoes; 2 acres turnips and parsnips; beans in drills, 4 acres; clover, 4 acres; total green crops, 22 acres; naked fallow, 5 acres; orchard, garden, home-stead, and roads, 4 acres. The stock consists of 4 horses, 2 colts, 1 bull, 16 dairy cows, 15 heifers, 8 calves, and 3 pigs. All good useful stock, well adapted for the district. The general improvements upon the farm consist of deep and thorough drainage, the eradication of old

crooked fences, and the planting and preserving of new ones, and filling up of old marl pits and ditches, the decreasing of the number, and consequently the increasing of the size, of the fields. One large stone drain upon the farm is worthy of especial notice. It is 400 yards in length, and at its commencement, and for more than three-fourths of its length, it is five yards from the surface. Its width and depth are each 14 inches. Since its completion it has continually discharged, and still continues to discharge, so vast a body of water as to be almost incredible without ocular demonstration. We need scarcely say this drain has been of immense benefit to all parts of the farm in its immediate neighbourhood. Upon the moss land Mr. Bridge has been at great expense in sinking for fall preparatory to draining. The draining of this land has been done in a most efficient manner. The drains are from 8 to 10 yards asunder, and generally 4 feet deep. They are laid with pipe tiles of 1 and 2 inches bore. The extent of land thus drained within the last four years is 80 acres. The green crops have been all well manured, are remarkably free from weeds, and, considering the nature of the soil, will be very productive. About 20 acres of the grass land have been laid down within the last two years, and, in our opinion, in a very proper manner. The old meadow land is also in a good state of cultivation, the fences are neatly trimmed, the ditches are well scoured out, the homestead is kept in a clean and orderly manner; in a word, the whole management of the farm reflects the highest credit upon the skill and industry of its occupier. Your inspectors, however, submit that a liquid manure tank would be of great service on this as well as on other farms in the district.

For the premium for the best cultivated farm of less than 50 statute acres we regret to find no competition. The farm inspected is by no means in a first-rate state of cultivation. The tenant, however, we think industrious and persevering in his endeavours to improve his farm; therefore we would recommend the society to award him at least one half of the premium.

The crops of wheat inspected are all good, clean, and well managed; the yield, however, not prove equal to that of those inspected last year.

Of oats we have inspected twelve lots, all good; some indeed, so superior that we have had great difficulty in coming to a decision satisfactory to ourselves.

The crops of barley are not so good as we could wish. The prize crop is a fair average one, but not so free from weeds as it ought to be.

The entries for drilled beans are not so numerous, neither are the crops inspected anything like so heavy as those of last year.

The yield of potatoes we find nearly double that of last year. The crops inspected are clean and well cultivated in general. We regret, however, to find that the mysterious potato "disease" has more or less infected all the crops that have come under our notice. We again strongly recommend the farmers of the district to plant this root as early as possible, and to plant early kinds, such as the different varieties of the "Kemp."

We perfectly agree with the decision of your committee, that it will be more advisable to inspect the crops of Swedish turnips, mangel wurzel, and carrots, about the middle of October next, when it is presumed that each crop will have arrived at maturity, thereby allowing parties to compete on more equal terms.

For Mr. Walmsley's premium for the best crop of parsnips only one crop has been inspected; and though the tenant appears to have spared neither expense nor trouble to ensure a good crop, we are sorry to say the crop has failed, proving, as we think, that moss land is not suitable for the cultivation of this root.

Of the cottage gardens we can only say that each is well worthy of the prize awarded to it.

In conclusion, it affords us great pleasure to be enabled to state that we have found exceedingly good farming in the district. Draining, however, the foundation of every improvement, is much wanted in many parts. We would therefore most respectfully press upon landlords the urgent necessity which exists for their liberally assisting their tenantry in this most important requisite, and likewise in providing them with liquid manure tanks, and every suitable convenience for keeping a far greater number of cattle upon their farms. To the tenants he would say—Keep your fences within due bounds; diligently cultivate every part of the land for which you pay rent and taxes; let your ditches be regularly and properly scoured out, so that the advantages of draining may not be thrown away; and by all means endeavour to keep a large number of good stock, so that the greatest possible quantity of your produce may be consumed upon your farms.

We remain, gentlemen, your obedient servants,

WILLIAM JACKSON } Inspectors.
HENRY FISHER }

FARMS.

Best cultivated farm, not less than 50 statute acres, £4,
Mr. Edward Bridge, Farington.
Second best ditto, £1, Mr. Peter Rimmer, Farington.

CROPS.

First Class, not less than two acres.

Best crop of wheat, £1 10s., Mr. John Linaker, Hutton.
Ditto oats, £1, Mr. Thomas Strickland, Penwortham.
Ditto barley, £1, Mr. Richard Dandy, Penwortham.
Ditto beans, in drills, £1, Mr. Thomas Blackburn, Howick.
Ditto potatoes, £1, Mr. Wright Carlisle, Howick Hall.
(Swedish turnips, mangold-wurtzel, and carrots to be inspected in the month of October.)

Second class, not less than one acre.

Best crop of wheat, 15s., Mr. Edward Pye, Longton.
Ditto oats, 10s., Mr. James Hesketh, Longton.
Ditto barley, not sufficient merit.
Ditto beans, in drills, 10s.; and ditto potatoes, 10s.;
Mr. Edward Pye, Longton.
Ditto parsnips, £2, Mr. Edward Bridge, Farington Hall.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(FROM THE MARK LANE EXPRESS.)

Upon the first appearance, in the *Morning Chronicle*, of the articles entitled "Labour and the Poor," we gave our unqualified opinion of their great importance and value. We should have been well-pleased had we been able to transfer to the columns of this Journal all the articles having reference to the agricultural districts: the press of other matters has, we regret to say, rendered the attainment of our wishes in that respect impracticable. We have, however, in some degree attained our object by inserting a certain number of these articles in the *Farmer's Magazine*, which, going into the hands of several thousand persons monthly, will widely diffuse the information which they contain. We have no means of knowing to what extent the fervid style of the writer of these articles may give colour to his statements; but, unhappily, if a full measure of allowance be made for any such effect, there still remains enough of hideous reality to horrify the reader, even though his breast be made of "sterner stuff" than ordinary. We thought the description given in some of the early articles of the state and condition of the labouring poor in the western counties, miserable enough; but that which is contained in an article which will be found in another part of this Journal, far exceeds any that have gone before it, in developing a state of wretchedness, misery, and pollution, alike discreditable to the victims as to the authorities and more influential inhabitants of the several districts. It may be said that the statements made in the article in question are *ex parte* and exaggerated; if so, by giving publicity to them, we shall bring them under the notice of some of the parties involved in the serious charge of permitting such a state of things to exist; and if capable of denial or palliation, we shall be most happy to make our columns the channel of exculpation. The article in question has reference to the counties of Hertfordshire, Bedfordshire, Huntingdonshire, and Cambridgeshire, and commences with the following sweeping condemnation:—

"The dwellings of the labouring classes in the above-named counties are, generally speaking, badly constructed, unhealthy, and over-crowded."

The following description, although written some time since, is stated to be "but too true at the present time":—

"Mr. Lowe, the clerk to one of the unions in this district, in his report to Mr. Weale on the condition of the cottages of

the agricultural labourer, says: 'If we follow the agricultural labourer into his miserable dwelling, we shall find it consisting of two rooms only. The day room, in addition to the family, contains the cooking utensils, the washing apparatus, agricultural implements, and dirty clothes; the windows broken and stuffed full of rags. In the sleeping apartment the parents and their children, boys and girls, are indiscriminately mixed, and frequently a lodger sleeping in the same and only room; generally no window, the openings in the half-thatched roof admit light, and expose the family to every vicissitude of the weather: the liability of the children, so situated, to contagious maladies, frequently plunges the whole family into the greatest misery. The children are brought up without any regard to decency of behaviour, to habits of foresight or self-restraint; they make indifferent servants; the girls become the mothers of bastards, and return home a burden to their parents or to the parish.'"

The dwellings of the labourers in Hertford, St. Alban's, and Ware, as well as in the northern and eastern parts of the county of Hertford, which adjoin to Essex, Cambridge, and Suffolk, are described to be "of the worst possible description." It is further stated that—

"The principal owners of this kind of property are small tradesmen, whose sole aim and object are to extort as high rents as possible from the poor people, and to avoid the slightest outlay upon the property."

Where are the landed proprietors in this district, and what are they about? Have they been ignorant of the state of things around them? At all events they can no longer plead ignorance. We would accept the plea rather than believe that, knowing its existence, they suffered it to continue. It is admitted on all hands that good, clean, warm, and properly ventilated buildings are necessary for the well-doing of the quadrupeds which take a prominent position in the farmer's establishment: surely, then, the bipeds, who play a still more important part, who are human beings, free-born Englishmen, fellow-citizens, equal in the eyes of God with the highest and wealthiest in the land, are entitled, as regards their dwellings, to some little more consideration than our four-footed beasts of burthen. The state of Bedfordshire is thus described:

"In the town of Bedford there are several rows of small houses built back to back, without the slightest means of thorough ventilation. Perhaps the worst place of this kind is one called Gravel-lane, where I was informed as many as forty persons died of cholera during the visitation of that disease. In another place called Beauchamp-row, fever is seldom or never absent. In the parish of Flitwick comparatively few of the houses are drained, dunghoops abound in the immediate vicinity of the dwellings, while the exhalations from a stagnant pond in

the neighbourhood, in warm or foggy weather, are most injurious to the health of the inhabitants. In Toddington the cottages are equally as bad. In the Leighton Buzzard union many of the houses occupied by the people are perfectly unfit for dwellings; great numbers of them have no bedrooms, and the families are compelled to live and sleep in the same apartment, in which the bare ground forms the only floor. The cottages in the parish of Eddlesborough are as bad as it is possible for such places to be."

This is, however, but a partial description of some parts of the county. For the remainder we must refer our readers to the article itself. Proceeding into Cambridgeshire, the writer states that in "many parts of the town of Cambridge the dwellings of the poor are also in the most disgraceful condition." For a description of unprecedented filth and pollution we must refer to the account given of a place "called the Falcon Yard." Cambridge, the site of one of our universities, an ancient seat of learning, the Alma Mater of many of our celebrated statesmen, lawyers, dignitaries of the church, and influential noblemen and gentlemen, to be thus unenviably distinguished is doubly discreditable. The town of Ely, a cathedral town, is, however, superlatively remarkable, in comparison with every other place named in the four counties, for disgusting filth, excessive depravity, and unparalleled wretchedness. The description of an old woman, her apartment and its furniture, she being described as "one of the most notorious opium-eaters in the *opium-eating city of Ely*," is almost incredible, although it is in keeping with the other miserable cases which are afterwards portrayed. The shocking condition of the wretched families in the village of Witchford can scarcely be exceeded by the most harrowing description of Irish misery ever penned. It appears that in this village a Mr. Ward owns five houses of the worst kind, the appearance of the front of which is very bad. A description is given of the back, as also a conversation between this Mr. Ward and Mr. Coke, the medical officer of the Union, who accompanied the correspondent of the *Morning Chronicle*, and from which we subjoin an extract:—

"At the back or front door of each stood a pail or pan, into which the refuse of the house was thrown; and when full, the contents were emptied into the ditch close by, the current of which being stopped up, caused the most offensive of the contents to be deposited about the road, where they were either absorbed by the soil or flowed into the well. 'The pig don't get on well,' said the landlord of the place; 'it belongs to them as has got the fever. It's no use my taking it as it is, for they owe me £3 for rent. I wish they'd manage to get it on a little better, for it won't fetch near what they owe me as it is—it's always a cryin' for wittles.' 'I suppose,' said the gentleman who accompanied me, 'you would rather that the pig 'got on' than that the people got well?' 'The pig would be some security for the rent,' was the business-like and unfeeling reply of the landlord."

'Talk of Irish landlords! we must say nothing in disparagement of them whilst we have a Mr. Ward. What makes the case still worse is that the village is on the "high lands" and possesses "admirable natural facilities for drainage." Is there no landed proprietor or occupier of land contiguous to the village, whose *interest*, if not his "philanthropy," would induce him to make a drain to carry off the sewage from the village, and apply it to the fertilization of his own land? But what are the Guardians of the Union about?—have they reckoned the cost arising from the disease and penury caused by such accumulation of filth? The present suffering and the expense attendant upon such a state of things are but a part, aye, and a small part of the evil consequent upon it. Extreme demoralization and desperate recklessness cannot fail to distinguish a population thus circumstanced. We have ever been loath to entertain the idea that the prevalence of incendiarism, so much increased of late years, is ascribable to the suffering condition of the labouring classes. Even now we do not say it is so. It is, however, a singular coincidence that these counties are more remarkable for incendiarism than any others, so much so that some of the Fire Insurance Offices are declining to renew insurances on farming stock and thatched farm buildings, in many cases, at any rate.

HERTS, BEDS, HUNTS, AND CAMBRIDGE. (FROM THE MORNING CHRONICLE.)

The dwellings of the labouring classes in the above-named counties are, generally speaking, badly constructed, unhealthy, and over-crowded. Exertions have been, and are still being made, to improve the existing state of things, but hitherto they have been inadequate to meet the pressing and growing wants of that portion of the community for whose benefit such exertions are required. The noble example set by the Duke of Bedford—to whose exertions in this respect I shall have occasion hereafter to refer—cannot fail to be productive of an enormous amount of good, not only to the tenantry of his grace, who may be immediately benefited, but also as showing to other landed proprietors the benefits which result from improving the physical condition of the labourer, and at the same time affording to them the advantage of extensive experience in the best mode of providing increased cottage accommodation of a suitable character for the labouring classes.

Mr. Lowe, the clerk to one of the unions in this district, in his report to Mr. Weale on the condition of the cottages of the agricultural labourer, says, "If we follow the agricultural labourer into his miserable dwelling, we shall find it consisting of two rooms only; the day room, in addition to the family, contains the cooking utensils, the washing apparatus, agricultural implements and dirty clothes, the windows broken, and stuffed full of rags. In the sleeping apartment the parents and their children, boys and girls, are indiscriminately mixed, and

frequently a lodger sleeping in the same and only room ; generally no window, the openings in the half-thatched roof admit light, and expose the family to every vicissitude of the weather ; the liability of the children, so situated, to contagious maladies, frequently plunges the whole family into the greatest misery. The children are brought up without any regard to decency of behaviour, to habits of foresight or self-restraint ; they make indifferent servants ; the girls become the mothers of bastards, and return home a burden to their parents, or to the parish." This description, although written some time since, is but too true at the present time.

Commencing with the county of Herts, there are in the towns of Hertford and Ware a great number of wretched and dilapidated two and three-roomed houses in many of the back streets and alleys. There are also in the villages on the road between Hertford and St. Alban's, many miserable hovels. The town of St. Alban's, like those of Hertford and Ware, contains a great number of old and decayed tenements, many of which are densely crowded.

In the northern and eastern parts of the county which adjoin to Essex, Cambridge, and Suffolk, the cottages are of the worst possible description. Within a circle of about ten or fifteen miles, taking Saffron Walden, in Essex, as the centre, there is scarcely a resident proprietor, and the cottages are suffered to fall into ruin and decay. The principal owners of this kind of property are small tradesmen, whose sole aim and object are to extort as high rents as possible from the poor people, and to avoid the slightest outlay upon the property.

Proceeding from Herts into the county of Bedford, it will be found that the cottages of the labouring classes are also in a most disgraceful condition. In the town of Bedford there are several rows of small houses built back to back, without the slightest means of thorough ventilation. Perhaps the worst place of this kind is one called Gravel lane, where I was informed as many as forty persons died of cholera during the visitation of that disease. In another place called Beauchamp-row, fever is seldom or never absent. In the parish of Flitwick comparatively few of the houses are drained, dung-heaps abound in the immediate vicinity of the dwellings, while the exhalations from a stagnant pond in the neighbourhood, in warm or foggy weather, are most injurious to the health of the inhabitants. In Toddington the cottages are equally as bad. In the Leighton Buzzard union many of the houses occupied by the people are perfectly unfit for dwellings ; great numbers of them have no bedrooms, and the families are compelled to live and sleep in the same apartment, in which the bare ground forms the only floor. The cottages in the parish of Eddlesborough are as bad as it is possible for such places to be. The following description, given a few years since by one of the guardians of the union, is equally applicable to the present time :—"The poor have for some time been permitted to build hovels in the waste, and although some of them are much better than others, the whole of them, with the exception of one built by a wheeler, are without upstairs rooms ; in some instances these places are formed by being excavated in

the banks, over which a lean-to roof is placed, and they are necessarily extremely damp. There are many cases of extreme wretchedness among the people, numerous applications for relief are constantly made, and the relief, however liberally or carefully bestowed, is never followed by any improvement or permanent benefit. Much immorality and crime invariably exist among these people, some of whom are quite lost to all feelings of decency and virtue, which must be attributed to the promiscuous intercourse of the sexes of all ages, numerous instances of which might be adduced." "In the hamlet of Eggington," says the same gentleman, "there are twelve tenements belonging to a charity, formed originally out of two barns ; these are always inhabited by paupers of the lowest grade, and who, in their present condition, would find a difficulty in obtaining any decent cottage as tenant to a private individual. They are generally the resort of persons who are turned out of their houses for non-payment of rent, &c. Two only of the tenements have a room up stairs, and all except these two have dirt floors ; the other ten tenements consist of one room each. In two or three instances this room is divided by a sort of partition put up by the inmates. The largest number of persons occupying one of these tenements is eight—a man, his wife, and six children, the eldest child aged 16, the youngest an infant. There is no bed in the house, the whole family sleeping on two heaps of straw, confined in two corners of the room by stakes driven into the ground. None of the tenements are ceiled. There are no back doors nor windows for ventilation ; the filth is thrown out into stagnant pools in front of the building ; the stench is at all times great, and in hot weather of course proportionably increased. With the exception of one, the tenements are occupied by families with children of all ages. The number of persons on the whole is fifty-five. In the parish of Soulbury a building, formerly used as a workhouse, is now occupied by persons of depraved habits. One room is occupied by a man, his wife, and three grown-up daughters and a son ; two of the daughters have bastard children."

In the town of Woburn there is a place called Cobb's Row, consisting of about twenty houses of two and three rooms each, almost every one of which contains a separate family. "The place," said one of the lodgers to me, "is filthy in the extreme. There are no drains to any of the houses, and all the slops and mess have to be thrown down a gutter in front of the houses. Sometimes when it is stopped up with rubbish, the landlord, who lives in one of the houses, comes out with a broom and a kind of rake, and scrapes down the gutter ; and when the stuff has been left there for a few days, you may suppose what a pretty smell he kicks up. In hot weather we can't get a breath of air, for we dar'n't open the window because of the smell, and there we are shut up all the day, me and my wife and six children in one little poking room. Yes, and I have to pay 2s. a week, too, for the hole : and one of the duke's cottages, with two or three rooms in it, wouldn't let for so much as that. I shall try hard to see if I can't get in one of the next new ones that's built.

There's no chance of getting into one as is built now, for they're never empty, none of 'em." Many other villages and places might be named where bad cottages exist, and to the whole of them one and the same description would be almost invariably found to apply, as they are damp, low, cold, smoky, dilapidated, and comfortless; while great numbers of the inmates are almost constantly afflicted with catarrhal diseases, colds, inflammation of the eyes, dysentery, and frequently contagious and epidemic complaints.

The town of St. Ives is sadly deficient in good cottage accommodation. Many of the houses in the narrow courts and alleys leading off the Sheep-market are extremely old and inconvenient. To the houses in many other parts of the town the same remark applies. I was informed that one great reason for the non-improvement of the dwellings in this town was, that nearly the whole of the town was copyhold, and that as soon as any improvement was made, the agent of the lord of the manor invariably caused a re-valuation of the premises to be made, and, as the fines are arbitrary, usually exacted one equivalent to several years of the improved rental. Of course, under such a state of things, no person will attempt to improve the property, and the lord of the manor will not allow any tenement which has once been erected to be pulled down. Hence the great number of decayed and ruinous places.

In many parts of the town of Cambridge the dwellings of the poor are also in the most disgraceful condition. I might refer to King-street and the alleys leading therefrom, to Christ's-lane, and other places. But perhaps the worst of all is a place called Falcon-yard. In one of the houses which I visited there were thirteen families residing. In a room on one of the floors lived a man, his wife, and five children. The eldest boy was sixteen years of age, the eldest girl a little over fourteen, having been for several months a common prostitute, and three younger children, together with the parents, all slept in one and the same room: the eldest boy and girl, and two other children, in one bed on the floor; the father, mother, and one child on a stump bedstead. The number of persons residing in this Falcon-yard, I was informed, was about three hundred. There are two privies for the use of the whole of the inhabitants, but as they are at a distance of about fifty yards from some portion of the premises, those of the inhabitants who have back windows to their rooms are in the habit of throwing all their refuse out of the windows on to a large dung-heap in the Red Lion-yard, the reeking steam from which is constantly penetrating the rooms. "Here," said one of the inmates of this crowded and dirty yard, "this is my grand hole that I pays sixteen-pence a-week for—this is where me and my husband and daughters sleeps; the bed is about as big as an old pocket handkerchief. I have been here four-and-thirty years." "I've got two rooms," said another person, "and here's our bed-room," opening at the same time a small door which led to a dark recess, in which there was no window or light whatever. A piece of paper, however, was lighted, and I was then enabled to distinguish the form of a bedstead in one corner, and a heap

of bed-clothes on the floor in the opposite portion of this "black hole." The "Falcon," which gives its name to the yard, was formerly a very extensive inn. There is an old-fashioned gallery which runs round the yard, and the different apartments round this gallery have been let off to lodgers at rents varying from 1s. 4d. to 2s. per week. Several of them are kept remarkably clean, considering the character of the place, but the majority are as wretched as it is possible to conceive. They are all of them very dark and ill-ventilated.

But the town of Ely and one or two of the surrounding villages, perhaps, bear a worse character than any other part of these counties. In a house in Broad-street, in which one of the inmates was suddenly seized with diarrhoea, the floor of the room (or ground rather, for there was no flooring or even brick to it), in which he lay, was about a foot below the level of the adjacent ground. At the back of the cottage was a large heap of pig and other manure, which reached to the sill of the window. The head of the old stump bedstead on which the sick man lay was close to the wall, and the filthy fluid of the dung-heap outside was oozing through the wall, within a few inches of the bed's head. At one place in Benton-square, which I visited, lay an old woman upon one of the dirtiest stump bedsteads that I had ever seen. Her person was disgustingly dirty, the wretched covering of the bed filthy in the extreme, while the stench of the room was almost overpowering. Myriads of animated existences luxuriated in the dirt and filth of the wretched bed and its occupant. The woman, I was informed, had not suffered herself—and judging from the dirty appearance of the other members of the family they had not pressed her much upon the subject—to be touched with soap and water for the last six years; and I was informed that no article of her wretched bedding had been cleaned or removed for the same period. She was one of the most notorious opium-eaters in the opium-eating city of Ely. The exhilarating effects of her last dose had passed off, and had given place to that wretched lowness of spirit in which the life of an opium-eater alternates. As the repulsive-looking hag sat upright in her filthy bed by the chimney-corner, her uncouth and cadaverous features streaked by the various courses her tears had taken in her intervals of despondency, and which were some shades less dirty than the other portions of her face, with her tangled grey hair hanging over her shoulders, her shrunken neck and withered arms, which were exposed to view as she rolled up another pill of the filthy-looking drug, and raised it tremblingly to her discoloured lips, presented a spectacle more loathsome than imagination could conceive. The only articles of furniture in the room were an old chair or two and a rough-looking three-legged table. Her daughter, twenty-eight years old, was standing by the side of the fire, and two grown-up men—her sons, I was informed—were sitting upon an old form or bench in front of it; two dirty, ragged little urchins completed the number of the inmates. "I've been on this here bed six years," said the miserable old woman; "I fell down, and broke my hip,

and it wasn't set. I've never been able to get out of this room, nor beyond the side of the bed, all that time. I won't go in the workhouse, I'd rather stop and die where I am." Adjoining the cottage, as if to see how much filth and stench could be accumulated in the smallest possible compass, was an enormous open cesspool, which formed the receptacle of the garbage and refuse of all the houses in the square. There was, perhaps, no labourer who earned more money when employed than the husband of this woman. The greater part of his earnings, however, was always spent either in opium or in drink. Within a few yards from this disgusting place was another cottage, with scarcely an article of furniture in it. The glare of a few expiring embers in the fire-place displayed at intervals damp and discoloured walls, a broken ceiling, patched-up windows, two broken chairs, a table, an old chest of drawers, and the shoeless feet, ragged clothes, and dirty faces of five young children, who sat huddled together around the hearth, to enjoy the infinitesimal amount of warmth which the fire could furnish. The father was out of work, the mother was selling matches in the town. The eldest child only went to school, and that a Sunday school, but could not read. There was one bed for the whole family. In Walpole-lane there is a row of houses from which fever is never absent; the small piece of ground at the back of these dwellings can be compared to nothing but a wide-spread dung-heap; a well, a privy, a pigstye, a muck-heap, and a stable, are all in immediate proximity to each other; and perhaps the most filthy of all the places, inasmuch as it receives a portion of the contents of each of the others, is the well which supplies the water for the use of the inmates. One hovel close by, consisting of but one room, in which was a large family, had on one side of it an enormous dung-heap, on the other a pigstye, at the back a filthy ditch, and immediately in front the privy used by the whole of the inhabitants of the lane. In another part of the town, called Bug's-hill, the cottages are in the same condition. The rent paid for these dens varies from 1s. to 1s. 6d. per week. During the last few months there have not been less than forty-three cases of diarrhoea in these disgusting places.

As might be expected from the disgraceful condition of parts of the town, the rate of mortality is fearfully high, compared with other parts of the country. Mr. Cole, one of the medical officers of the union, informed me that in those parts of the town to which allusion has been made, influenza, scarlet fever, or fever of a typhoid character, are seldom or never absent, and that small pox, caused in a great measure by the neglect of vaccination, diseases of the respiratory organs, ague, and scrofulous affections, assume an aggravated form in these districts. Upon a comparison between the absolute mortality of Ely as a whole, and the absolute mortality of all England, it appears that the mortality of Ely is 26.1-11 for every thousand of the population, while that of all England is only 22. The difference of mortality between the city and the Fens is in the proportion of 29 for the city to 21.5 for the Fens.

Comparing the mortality of different parts of the city of Ely with each other, it appears that in those portions

which may be called the "seats of disease," the absolute mortality is as high as 34.5, while in the most healthy parts it is only 23.5. The same gentleman informed me, as the result of his experience and observation, that while the preventible mortality of the Fens was only 9, that of the town of Ely was 16.75.

But it is not only in the city of Ely that bad and unhealthy cottages are to be found: the villages around it are equally as bad, and if possible in a worse condition. At a place called Welsh's-dam, near Chatteris, there are sixteen cottages, containing together a population of eighty-one persons, among whom there were last year not less than eleven fatal attacks of cholera, besides a number of cases of diarrhoea. The cottages are built by the side of an extensive dam, the upper part of which reaches to the tops of the windows of the cottages, and the houses are consequently damp and wretched in the extreme. At a place called Little London, situated on the Lynn road, there is a ditch which runs close to the backs of the houses; and the refuse from the other houses, which constantly floats upon its surface, is borne into the very doors. Here cases of fever and dysentery are constantly occurring.

There is one village, however, within two miles of the city of Ely, called Witchford, which in point of filth would bear comparison with the worst place in any part of the kingdom. Along the entire length of the village, and within a few feet of the doors and windows of the houses, is a slough extending over nearly the whole width of the road, containing and retaining accumulations of decaying animal and vegetable matter, either thrown from the dwellings or flowing into it from the adjoining farm-yards. The condition of the dwellings is wretched beyond description. Fevers of the typhoid character and scarlatina are never absent. In company with Mr. Cole, the union surgeon, I visited several places where fever was at the time most prevalent. In one cottage six of the family had been attacked with the disease. On going up-stairs into the sick chamber—if a hole in the roof deserves the name of a chamber—I found four beds. The apartment containing them might be about 14 by 10 feet. The sides of the room were sloping, and the width of the ceiling could not be more than about six feet, while its length might be about the same. In one bed in this loft or room lay the father of the family, who had been confined with fever for six weeks, and in an adjoining bed lay his daughter, 12 years of age. The other two beds, and the unoccupied portions of those in which the victims of fever lay, were occupied by the wife and the five children during the night. The eldest boy was 14, and his sister 16 years of age. The condition of such a place, without the slightest means of ventilation—the dormitory of eight persons by night, and the sick room of two by day—can be more easily imagined than described. The foetid atmosphere, the moans of the child, the fevered eye and hectic cheek of the father, the broken plaster of the ceiling and walls, the creaking door and gaping floor, the broken windows stopped up with divers coloured rags, all combined to produce a scene which, for wretchedness and misery, could perhaps not be surpassed in any civilized or

even uncivilized part of the world. The room below was little if anything better than the one above. Through the dense smoke with which it was filled might be seen three sickly-looking children sitting by the fire—they were the other members of the family who had so far recovered as to be able to be brought down stairs. Three, four, and five weeks had been the respective terms of their illness; and those only who may have witnessed the utter prostration of strength which follows a partial recovery from fever will be able to form any conception of the wretchedness which these children presented. When the first member of the family was attacked, the doctor gave directions that the others should not sleep in the same room. This injunction, however, was unheeded; the reason being, that they could not make up beds on the cold and damp brick floor of the lower room. Either the front or back door of the cottage was obliged to be left entirely open, in order to allow the smoke to escape, the chimney being wholly useless for that purpose. This was an industrious family: the husband had received 7s. a week almost constantly, and had not been out of work since the harvest until the time that he was attacked. During harvest he worked day work, and received about 18s. a week for three weeks; but what he earned went to pay the shoemaker's bill. One of the neighbours had kindly attended throughout the whole period of their illness, in order to render any assistance in her power. In the next cottage were two persons, one of whom sat shivering with ague before the fire in the lower room, and in the upper one lay the wife burning with fever. In the third cottage sat, by the side of the fire, with a child six months old on his knees, a labourer who had that day been compelled to give up work; he was another victim to the deadly fever. By the side of him sat his sister, a young woman of 17 years of age, so far recovered from fever as to be allowed to be carried down stairs. In an upper room, of about eight feet square, with sloping roofs like the adjoining cottage, were two beds so close that they touched each other, in one of which lay the wife of the man in the lower room, and the mother of the child he was nursing. She was in the last stage of typhus. At the request of the doctor who accompanied me I turned to open the window of the room, the close atmosphere of which was almost unbearable. While engaged in opening the window, the attendants had succeeded in raising the patient in her miserable couch, and as I turned round an involuntary shudder came over me as my eye rested upon the wretched spectacle. There was a death-like gaze in the eye of the woman that unmistakably told of the approach of dissolution; her gaunt and bony features, sunken cheeks, and discoloured lips, bore evidence to the intensity of the attack under which she was suffering. By her side, in the adjoining bed, had lain for three weeks previously the sister, who was then sitting down stairs; and at night, in the same room, and in the same beds with the fevered patients, had slept, through the whole period, the husband and little child, two grown up young men, and their mother. In the next cottage the whole of the

family, with the exception of the mother, had had the fever, and both parents were at that moment suffering under a loathsome disease. In the fifth and last house, the inmates were complaining of colds and pains in their eyes.

There were living altogether in these five houses 37 persons. The rent was from £2 10s. to £3 per annum. The owner, a Mr. Ward, I believe, dwelt close by the property. From appearances in front of the houses I was prepared for such a state of things in the rear. But the worst that I had conceived fell infinitely short of their actual condition. Four upright pieces of wood, not more than four feet in height, with several other pieces laid transversely over the top, supported a quantity of loose straw, which was called the "thatch" of a place dignified by the name of a "privy," the ground being covered by the filth which flowed over out of a small hole intended as its receptacle. Within a few feet from this was the well containing the liquid which the people drank, its component parts being made up of the overflow of the privy, the refuse from the pigstye, the contents of a ditch into which the slops from the houses were thrown, and the spring of the well itself. The water presented a dull and turbid-looking appearance, and its smell was most offensive. Heaps of pig and other manure lay piled, in some cases against the walls of the cottages themselves, in others a few feet removed from them. At the back or front door of each stood a pail or pan, into which the refuse of the house was thrown; and when full, the contents were emptied into the ditch close by, the current of which being stopped up caused the most offensive of the contents to be deposited about the road, where they were either absorbed by the soil or flowed into the well. "The pig don't get on well," said the landlord of the place; "it belongs to them as has got the fever. It's no use my taking it as it is, for they owe me £3 for rent. I wish they'd manage to get it on a little better, for it won't fetch near what they owe me as it is—it's always a cryin' for wittles." "I suppose," said the gentleman who accompanied me, "you would rather that the pig 'got on' than that the people got well?" "The pig would be some security for the rent," was the business-like and unfeeling reply of the landlord. On my alluding to the disgraceful condition of the yard, he said—"The place is my own, and I suppose I may do as I like with it; and as for the privy, it is only two or three months since I went to the trouble of putting it up—the house is as healthy as any other in the place." In this opinion I entirely concur, for nearly every house in the village is in the same disgraceful condition; and I was informed that in hot and wet weather, "the smell from it was most abominable." The village possesses admirable natural facilities for drainage. It is not situated, as many villages are, in the marsh or fen land; on the contrary, it is on the high lands. Reports have been constantly made on its sanitary condition to the guardians of the poor, but they have been, and still are, comparatively unheeded. The dread of incurring expense prevents anything from being done for the improvement of the place. Meanwhile the parish supports the sick by means of out-door relief; the ex-

pense of the first family alluded to having been in one week not less than 23s. 3d., exclusive of the charges for medical attendance.

LETTER XIV.

NORFOLK, SUFFOLK, AND ESSEX.

Before proceeding, as I propose to do, separately and in detail with the counties which are named at the head of this letter, I shall briefly state the extent and population of that portion of the eastern district of England comprised in the counties of Norfolk, Suffolk, and Essex. These three counties together contained in 1831 a population of 1,003,868 souls. In 1841 the number had increased to 1,072,716, being about one-fourteenth of the entire population of England and Wales. Assuming that the population has increased in the same ratio during the eight years since 1841 as in the years previous to that date, the present population of the three counties would be about 1,130,716. Between the years 1831 and 1841 the increase had been at the rate of 6·8 per cent., while the increase for the whole of England and Wales had been 13 per cent. Consequently, the increase in this portion of the eastern district is 6·2 per cent. below the average per centage of increase in England and Wales. The three counties contain within their boundaries 3,190,030 acres, or a superficies equal to about one-twelfth of the whole of England and Wales. From this it is evident that, since the population of these three counties—being equal to only one-fourteenth of the entire people—is spread over one twelfth of the surface of England and Wales, the pressure of population is below the average of the whole country. The number of inhabitants to 100 statute acres is, for Essex, 35·2—for Suffolk, 32·5—for Norfolk, 31·9. There are 16 counties which have a lower number of inhabitants to 100 acres than Norfolk, 19 have less than Suffolk, and 24 less than Essex.

Having thus dealt in a very general manner with the whole of the group of counties, I shall now proceed to touch very briefly upon the leading physical and social features of the county of Suffolk; and I shall afterwards enter fully into the more immediate subject of my inquiry—viz., the condition of the labouring classes of the county.

The county of Suffolk is in length from north to south about seventy miles, and its breadth from east to west is about fifty-two miles. On the east it has the ocean for its boundary; the rivers Yare, Waveney, and Little Ouse divide it on the north from Norfolk; the river Lark divides it from Cambridge on the west, and the Stour separates it on the south from the county of Essex. It contains 1,515 square statute miles, or 969,600 acres. The greater portion of the county is of diluvial formation. In the north-western parts it is chalky—while Norfolk crag and London clay are to be met with in various other parts. The soil is not generally what might be called rich; a great portion of it is of a light and poor character. It has been calculated that there are within the county 40,000 acres of rich loam, 80,000 of marl, 150,000 of sand upon a subsoil of crag (and occasionally of a rich character), and about 100,000 acres of poor sand

and chalk. 250,000 acres are considered to be under tillage, 500,000 in pasture, and 229,200 wooded or unproductive. The tillage of Suffolk bears rather a high character, and the farmers generally are not deficient in practical or scientific skill. The chief products of the county are, cement, stone, lime, marl, bricks, salt, corn, horses (for which it is famous), cattle, butter, cheese, and malt. There are also considerable manufactures carried on at Ipswich. The sea coast is low, and is considered dangerous on account of the sand-banks and shoals which abound in its neighbourhood. There is scarcely a town of any size in the interior that cannot avail itself of the facilities afforded by the various rivers for inland navigation. There are about 52 miles of railway completed within the county, which connect the principal towns in its central and western districts.

In 1831 the population of Suffolk of 296,317; in 1841 it had increased to 315,073. Assuming that the increase of population for the eight years since 1841 has been in the same ratio as during the ten years previous to that period, it will be found that Suffolk has increased since 1841 at the rate of 5·4 per cent., which, upon the census of 1841, would be equivalent to 16,000, and would make the present population amount to 331,073.

The number of persons returned as agricultural labourers in the census of 1841 were, males, above 20 years of age, 31,237; under 20, 4,935; females, above 20, 566; under 20, 132; making a total of male and female agricultural labourers, of all ages, of 36,870. Of farmers and graziers there were 5,380, from which it would appear that the average number of labourers employed by each farmer or grazier was not quite 7, but only 6·7. The number of domestic servants, male and female, was 17,174, or rather more than 5 per cent. of the whole population; and of this number 7,081 were under 20 years of age. The amount of real property assessed to the property and income tax is £1,717,825, being 1·07 per cent. above the average of the same amount of population throughout England and Wales. The number of independent persons in the county was 7,499, or 15·1 per cent. below the average. About 30,000 of the population are employed in trade, commerce, and manufactures; among whom may be reckoned 1,343 in connection with fisheries, or otherwise engaged in shipping, 879 employed in silkworks, 169 in the woollen and worsted trade, 322 in weaving, 75 spinners, 412 engaged in the malt trade, and 131 in ironworks. The number of inhabited houses in 1841 was 64,041, being at the rate of 4·9 persons to each house—the average number of persons to each house in England, exclusive of Wales, being 5·5. There is, therefore, it would appear, a larger amount of house accommodation in Suffolk than the average of the whole of England. The number of individual depositors in savings banks has increased from 9,332 in 1840, to 13,038 in 1847. The amount of deposits in the former year was £280,913; and in the latter, £375,145. In the years 1840, 1841, and 1842, the average amount of each depositor was, during each year, £30, and for the remaining five years it was £29 in each year. In 1847 the average amount of each depositor was £2 more than the average of

England and Wales; in each of the years, 1840-1-2-4-6, it was £1 more; and in 1843 and '45 the amount was equal to the average.

Foremost and most important among the labouring classes of Suffolk stand its agricultural labourers, amounting, as we have seen, to not less than 36,870 persons, of both sexes and all ages. But this number represents only those who are actually employed in agricultural work. The subject of the present investigation is, "Labour and the Poor," and although 36,870 may be the number of those whose industry is devoted to the purposes of agriculture, yet the inquiry must be extended to those who, unable from youth or other circumstances to labour in the fields, are still dependent upon agriculture for their support. A calculation has been made by Mr. Porter, in his "Progress of the Nation," founded upon the census of 1841, the result of which is, that there were then in the United Kingdom 3,343,974 persons engaged in agriculture, including occupiers, farmers, graziers, and labourers, and that there were dependent upon them 13,604,915, or about four times the number of those actually employed. The number of agricultural labourers in the county of Suffolk was in 1841, as has already been stated, 36,870. Assuming the same ratio to exist in the case of the labourers alone as with respect to the occupiers, farmers, graziers, and labourers collectively, it would follow that the number of persons dependent upon agricultural labour is four times as great as the number of those who are actually employed as labourers. Adopting this proportion, therefore, as the basis of our calculation, we shall have in the county of Suffolk 147,480 persons of all ages dependent upon agricultural labour for their support. To this number, however, must be added the increase which has taken place in the population since 1841, at the rate of 5·4 per cent; and we shall then have a total of 156,012 persons, or very nearly one half of the whole population of Suffolk, who are either actually engaged in, or dependent upon, agricultural labour for their subsistence.

Upon comparing the number of agricultural labourers with the quantity of land upon which they are employed—including only pasture and arable—the proportion will be about 4·9 to every 100 acres. Upon making the same calculation with respect to six other agricultural counties—viz., Lincolnshire, Norfolk, Essex, Sussex, Dorsetshire, and Wilts—I find the proportion of labourers to 100 acres is as follows:—Lincolnshire, 3; Norfolk, 4·1; Essex and Sussex, 4·8; Dorset, 2·7; Wilts, 7·7. The amount of agricultural labour employed in Suffolk, in proportion to the cultivated soil, is therefore greater than in any of the counties above enumerated, with the exception of Wilts. The annual value of the agricultural produce of Suffolk may be taken to be—

250,000 acres of arable land, at £7 per acre	£1,750,000
500,000 acres pasture, at £6 per acre	3,000,000
Total	£4,750,000

Being at the rate of nearly £130 to each labourer employed. The sum which may be considered as

paid for wages to the persons so employed, as near as I have been enabled to judge from the information I have received as to the rates of wages and the amount of employment given during the year, in various parts of the county, would be as follows:—

The total number of male labourers above 20 years of age is 31,237, of whom there were—

One-fourth, or 7,809, at 12s. per week, for 52 weeks ..	£243,250
One-fourth, or 7,809, at 9s. per week, for 52 weeks ..	182,728
The remainder, amounting to 15,619, at an average of 7s. 6d. per week, for 40 weeks ..	234,270
Total male labourers above 20 years of age	£660,248
566 female labourers, above 20, at 5s. per week, for 40 weeks	5,660
4,935 males, under 20, at 3s. 6d. per week, for 40 weeks	34,545
132 females, under 20, at 2s. 6d. per week, for 40 weeks	660
Total	£701,113

During the harvest month the labourers, however, receive double wages; and the amount so paid—taking the above calculation as the basis—would be £60,311, which, added to the sum paid in regular wages, makes a total of £761,424 paid in wages for agricultural labour in Suffolk, being equal to about £21 per annum to each labourer.

Having thus referred to the general statistics of labour, I proceed to what may be regarded as the more immediate object of my inquiry, viz., the condition of the labourer himself. In so doing I shall first deal with what I consider to be of the most paramount importance with respect to the well-being and comfort of the poor—I mean their physical condition.

In travelling through the county of Suffolk, perhaps the first thing which would strike the attention of the traveller would be the fact that he would scarcely see a single cottage untenanted. Upon making inquiries into this subject, I have uniformly been told that, notwithstanding the increase which has taken place in the population, there has been comparatively little or no increase in the amount of cottage accommodation for the people. Many of the cottages, especially those in the immediate neighbourhood of the larger towns, are greatly overcrowded with persons who work in the town, and who wish to live near their work. In too many cases, the occupiers of the cottages, regardless of the want of decency and comfort which must follow from such a practice, are in the habit of taking in these persons as lodgers, in order to obtain assistance in paying their rents, which in the great majority of instances are enormously high, compared with the accommodation provided. Where the owners of the soil reside among their tenantry, or where the estates are left to the management of persons who take an interest in the welfare of the people, it will be found that the cottages and tenants are the most comfortable. In many portions of the eastern districts of the county this is peculiarly the case. I might mention nu-

merous instances of this which have come under my own notice. The cottages upon the estate of the Earl of Stradbroke, near Halesworth, have both a comfortable and an ornamental appearance. They are generally built of brick, with tile roofs; few, if any of them, have less than four rooms, and they have also suitable out-offices, and are well supplied with cupboards and pantries. They are generally only one story in height, the bed-rooms being on the same floor as the parlours and kitchens. The cottages also upon the estates of Sir Edward Kerrison, near Stradbroke, are remarkable for their neat and comfortable appearance. They generally contain four or five rooms, and in all cases they have pieces of ground either attached to them or at a small distance, varying from an eighth to a quarter of an acre in extent. There are probably few gentlemen in the county who have successfully devoted so much time and attention to the improvement of the cottages upon their estates as the Rev. Mr. Benyon, at Culford, who resides about five miles from Bury. Nothing can exceed the neat and pleasing appearance of these dwellings. They are built with blue flint stones, which are dug in the neighbourhood, and they are faced with bricks. The roofs are slated—the colour of the slates and of the blue flints being agreeably relieved by the facings of brick. Each cottage has four rooms—some, which have been more recently erected, contain five. On the ground-floor there is a “keeping room,” used as a pantry, or larder; a back-kitchen, fitted with a copper, stone sink, and other conveniences; a small room which is used as a cellar; a sitting-room in the front of the house, about 14 ft. by 12 ft., and 7 ft. in height; and two bed-rooms up stairs. At a short distance from each set of cottages (they are generally built in pairs, and in some cases there are three standing together) there is a wooden erection with a tile roof, enclosing a place for fuel, a privy for each cottage, and an oven. In some instances the oven and coal cellar are under the same roof with the cottage, and the privy stands a short distance from the cottage. Mr. Benyon informed me that his tenants were always regular and punctual in the payment of their rents, and he believed that a great improvement had taken place in their moral condition since their dwellings had been improved. The cost of the double cottages averaged about £170, or £85 each. Attached to each of them is a quarter of an acre of land.

The cottages at Buxhall are also deserving of the highest commendation. The Rev. Mr. Hill, late rector of the parish, has devoted a great deal of time and attention to the best mode of constructing labourers’ dwellings. A few years since he received the gold medal of the Agricultural Society for the best essay upon the subject. His excellent and amiable wife accompanied me to several of the cottages; and it must be a source of gratification to them to see that their praiseworthy efforts for the improvement of the condition of their tenants have been crowned with so complete and signal success. The cottages are built of clay, made up in the form of large bricks and dried in the sun; they have thatched roofs—it being very generally supposed that the thatch, when well done, is warmer in winter and cooler in summer than slate or tile roofs.

The cottages are built in pairs, and have each two rooms on the ground floor, one of which is used as a pantry, and two rooms above. The kitchen, or down-stairs room, has a brick floor, and is provided with an oven and a small cupboard. The whole of the rooms are well lighted. There is no ceiling to the lower room; the rafters and timbers are stained to imitate dark oak, and they afford a very pleasing contrast to the whitewashed walls. The cottages are well drained, and have a good supply of water. The chimneys are built in an octagonal shape, with small white bricks, or a somewhat ornamental style, and they give to the houses a pleasing picturesque appearance. The cost of the pair of cottages just described was somewhat under £120. One of the rules enforced by Mr. Hill upon letting his cottages is, “no pigs, no poultry, no lodgers.” He stated to me that he had adopted this rule in order to allay or remove the jealousy which is very generally found to exist on the part of the farmers towards any of their workpeople who are in the habit of keeping either the one or the other of these. They have an opinion—whether well founded or not I cannot say—that keeping pigs and poultry does not tend to improve the honesty of their labourers; and they fear that occasionally some portion of their grain might find its way into the corn-bins of the cottagers. The rule against taking lodgers has been framed with the view of preventing the overcrowding of the cottages. With respect to the payment of the rents by the tenants, Mrs. Hill informed me that they were always punctual to the day. “Last Michaelmas-day,” she said, “twenty-eight of the tenants dined with us, and every one of them brought his three guineas for the year’s rent to the very halfpenny.”

In addition to these individual cases, which might be multiplied to a considerable extent, a decided improvement has also taken place in the neighbourhood of some of the larger towns. And for the most part the better class of cottages are clean and neat in their appearance. In some of the newer-built ones, the boards of the upper rooms and the stairs leading to them are almost milk-white. You feel as if it would be no great hardship if you were compelled to take your meals off them—they are so perfectly clean. The walls, both externally and internally, are generally kept well white-washed. The different articles of furniture are also remarkably clean; the chimney-pieces are frequently ornamented with a pair of bright brass candlesticks; sometimes a small shelf contains a few articles of crockery—a fancy beer mug generally occupying a rather prominent position among its companions. On the ground-floor you may find some four or six strong, and perhaps not very modern, wooden chairs; a chest of drawers; a table or two, one of which supports a tea-board, with a youthful Moses or a grey-headed David for the centre-piece; and in a great many instances you will not fail to hear the drowsy ticking of a Dutch clock in the corner, and to see a magpie chattering in his wicker prison, with a cat sleeping comfortably on a clean and unassuming rug. You will almost invariably notice in cottages of this description the signs of a genuine, though untutored taste for the “fine arts,” manifesting itself in a few anti-

quated and gaudy coloured pictures, which hang around the room. Many are the saints of high renown, such as St. Ignatius, St. Augustine, St. Ambrose, and others, who keep watch and ward over these homely hearths. It does not appear that these humble pictures are held in estimation in consequence of any peculiar reverence which the people entertain towards the sainted originals—for in many cases they do not know whom they are intended to represent. The price of them, including frame and glass, is generally one penny; and it is no doubt in consequence of their cheapness that they are so generally patronized. There are not a few of the cottages which have cheap likenesses of the Queen and Prince Albert—and by the side of these I saw, in several instances, what purported to be likenesses of the Prince of Wales and the Princess Royal. The cottage libraries, unfortunately, are generally of very minute proportions. This, however, is easily accounted for by the fact that so few of the inmates are able to read. The sleeping apartments of the tenants in the better class of cottages are also, in the great majority of cases, remarkably cleanly and neat in their appearance.

Having now glanced at the condition of the better class of the dwellings of the poor, I shall proceed to draw aside the veil which conceals from the superficial observer the wretched condition in which vast numbers of the peasantry of Suffolk are to be found in their miserable homesteads. I have now lying before me the description of upwards of eighty cottages in different parts of the county, which I have visited since my arrival. I shall give the reader a few of them, arranging them in classes according to the number of apartments in each. The first class to which I shall refer is that consisting of cottages with only one room, but which, in the great majority of cases—by means either of a wooden partition, or by hanging up some old quilt, or even articles of apparel sewn together, over a line stretched across the room—is made to serve the purpose of a dwelling and sleeping room. The number of these one-roomed cottages is, comparatively speaking, small in proportion to those of other classes.

The first cottage of this class which I visited was in the neighbourhood of Stradbroke, and was occupied by a widow and her three daughters. The entrance was so low that you had to stoop in order to gain admittance. The building lay back at some distance from the road, and in the rear of another row of cottages, which I shall presently have occasion to refer to. It was lighted by means of a small window, about two feet square. The thatch—and, indeed, the whole building—was fast going to decay. A wooden partition divided what might be called the sitting-room from the bed-room. The furniture of the place was of the most wretched character, consisting of two or three old chairs, a small table, a stool or two, and a few articles of crockery ware. Upon a sort of bench lay six loaves of bread, which the family had just received from the parish. "My mother," said a girl of about 18, to whom I addressed myself upon entering, "is a widow; she is out at wheat-dropping"—an operation which consists in dropping the seed-wheat into small holes made for its reception in the ground by

means of a "dibble," or "dibbler," in cases where it is not sown in the more usual manner either by broad-cast or in drills. "She can earn sixpence a day when she's at work at it, but she can't always get it to do; and sometimes when she can she can't go, because of leaving that poor creature alone"—pointing at the same time to a miserable idiotic-looking young woman, who was engaged in making lace-edging upon a pillow in her lap. I was struck with the peculiarly delicate manner in which she referred to the poor creature, and I asked her reason for speaking of her in such terms. "Because, sir, she do go wrong in her head; and if she was left at home by herself, there's no knowing the mischief she wouldn't do. She broke this, and that, and that," pointing to several articles of crockery and a square or two of glass in the wretched window, "the other day, when mother was out, and I wasn't at home to take care of her. When the poor thing's able to work she makes sometimes a penny, sometimes three-ha'pence a day; but when her fits comes on she can't work at all. My mother gets 1s. 6d. a-week and six loaves from the parish. We havn't got any garden. We pay 1s. a-week rent. My other sister is eight years old; she can't do anything either, for she's afflicted too." Adjoining this cottage was another, occupied by a newly-married couple, which was constructed upon the same plan. There was little or no furniture in the room; the wife was apparently in a deep consumption; her voice was almost gone, and it was with difficulty that I could understand what she said. Upon a few rags, spread upon two old chairs, in a recess between the window and the chimney, lay a weakly, sickly-looking infant, ten weeks old. "My husband," she said, "is out of work, and has been since harvest. I havn't been well since my confinement, and am so ill now that I can hardly get about. We have been married two years. When I was first married my husband earned 8s. a-week. Through his being out of work we have got behind in the rent, but I hope we shall soon be able to fetch it up. We havn't got no garden, and we pays eighteenpence a-week, when we can pay it." The place was remarkably clean, notwithstanding the abject poverty of the tenants.

Another cottage which I visited—which may probably be considered an exceptional case, inasmuch as no rent was paid, but which I mention in order to show into what miserable hovels some of the poor people are glad to creep for shelter—was near Barrow. The building had once formed, to all appearance, a double cottage. The thatch of one portion of it was lying upon the ground, mingled with the timbers which once supported it: a portion only of the clay walls of one of the cottages remained standing. The thatch which had already fallen had left exposed to the wind and rain the portion of the adjoining cottage, between the thatch and gaping flooring, which formed the partial covering of the lower room. This room, which was a tolerably good sized apartment, was roughly and unevenly paved with bricks, the great majority of which were broken and cracked. Gleams of sunlight found their way through the broken thatch and crevices of the floor overhead, while the light from a small window, in which was scarcely an un-

broken square of glass, lent its miserable aid in showing the dreary wretchedness of the place. The furniture consisted of one old chair, a three-legged stool, a smaller stool; and nearly in the centre of the place lay upon its side one of those antique tables, with its labyrinth of legs, in which the genius of our ancient cabinet-makers was wont to indulge itself. Upon the broken flap, which lay uppermost, stood a broken basin and teapot. A few sticks of wood burning with a flickering blaze revealed the spot where once a fire-place stood, and in an old iron pot suspended over them the few potatoes were boiling which were to serve for the scanty meal of the day. Upon a line, which was stretched across one part of the room, immediately in front of the door, hung a tattered quilt, to conceal from view, or to shelter from the cold draught, a wretched stump of a bedstead, where, upon an old straw mattress and covered with a few rags, slept together at night the husband, the wife, and the three children who tenanted this desolate abode. "It's a cold place, indeed, sir," said the wretched woman, in a touching tone of sadness and despair. "My husband has had no work since harvest; the farmers turned off as many as they could then, when they'd got the harvest in. I don't pay any rent for the place; Mr. Bailey lets me live in it for nothing, to take care of the sticks. If it was not for this I don't know what we should do, nor where we should put our heads." I asked her if she was not afraid of the place falling down, and her answer was that she expected it would every day.

The next class of cottages to which I shall call the attention of the reader consists of those having a room on the ground floor, and a bed-room above; and in cottages of this character the greater proportion of the labouring population reside. Mr. Twisleton, in his report upon the sanitary condition of the labouring population of Norfolk and Suffolk, thus speaks of these cottages, and his description entirely agrees with all that I have witnessed myself. He says, "Although they may be sufficiently commodious for a man and wife and very young children, they are manifestly uncomfortable; and the having only one bed-room is even indecent for a man and wife and large growing family. But I have seen many instances where a man and his wife and six children of different sexes have slept together in one room, on three, and sometimes only two beds. The annoyance of thus herding together must be almost insufferable, and several mothers of families among the labourers have spoken to me with great propriety and feeling against the practice, saying, 'that it is not respectable or decent, and that it is hardly bearable;' 'that such a thing is not right for a Christian body in a Christian land;' and they have used other expressions of a similar import. In order to diminish the evil, they have recourse to various expedients, such as putting curtains to the beds, or dividing the room into two parts by pinning old counterpanes together, and sometimes by cutting up and sewing together old gowns, and stretching them across the room; all of which schemes are attended with the inconvenience that in a crowded apartment, where pure air is a scarce luxury, they have a tendency to check still more its healthful circulation. The

having only one room below is almost equally inconvenient; and where it is necessary to wash linen, to cook, to bake, and to perform all the ordinary household work in the same room, with children running and playing about, it is difficult for even the most tidy person to prevent her house from being, to use a favourite phrase of the district, in a constant 'muddle.' However, it not unfrequently happens that two or three of such cottages have a bake-house and wash-house in common, which, of course, lessens to a certain extent the discomfort of having only one day-room."

The first of the cottages of this character which I visited was at Wortham, a place just bordering upon the boundary of Norfolk and Suffolk. The exterior of the building presented a most wretched and dilapidated aspect. There were a few miserable articles of furniture in the lower room, consisting of two or three chairs and an old table. In the upper room was an old stump bedstead, upon which the husband and wife slept; and in two corners of the room lay a heap of indescribable looking rags, which marked the spot where seven children, the eldest of whom was fourteen, were in the habit of sleeping. There was no fire in the lower room, and the woman was suffering extremely, and expecting every hour to be confined with her twelfth child; she had seven living, and had buried four. Her husband was out of work. There was no garden or ground, and the rent for the hovel was £4 per annum. At a place called Coombs, near Stowmarket, there were a great number of wretched hovels of this description. I may perhaps state, in passing, that there are few places which bear a worse character, either in respect to cottage accommodation or the character of the inhabitants, than Coombs. Within the last three years no less than seventeen persons have been transported from it for various crimes, principally that of incendiarism. The population, I believe, does not exceed a thousand. Here is an account of one of the cottages. The lower room was so low, that when I had taken off my hat I could scarcely stand upright. The brick floor was several inches below the surface of the ground on the outside, and in damp or wet weather the inmates are constantly obliged to sweep the water away, as it either oozes up through the brick floor, or, entering by the doorway creeps sluggishly towards the hearth, which is the lowest part of the room. Throughout the whole of the place the effects of the dampness and moisture were everywhere visible; the lower part of the walls of the cottage were stained with damp to the height of two feet. Although the weather was dry, the bricks were wet and damp; and the woman, suffering from asthma and shivering with cold, sat with her feet upon a log of wood before a small fire, which had not sufficient heat to dispel the dampness from the chimney jambs. There was a little bit of garden, "but it is not enough to pay for the labour," said the poor man. "I sold the potatoes off it last year, but they didn't fetch the price of the seed." He had been out of work for some time. His wife earned 1s. 6d. a week by washing. They had no relief from the parish. "They won't give us anything," said he, "except we go into the house; and as long as I can arne a sixpence

anyhow, they sharn't part me from my wife." "No, that they sharn't," chimed in the woman. "I'd work the flesh off my bones afore I'd be parted and locked up like a felon; and I've never done nothing to deserve it, but have worked hard all my life, and this is what it's come to now!" "If I could only arne eight shillings a week," said the man; "aye, or even seven, all the year round, I wouldn't thank King George to be my uncle. But there's a many worse off than we are in this place. There's a poor man over the way that's got nine children, and hasn't got nothing to do either. Thank God we haven't got none. If we wur to go to the house, we should have to leave all our few things here, exposed like a desolate wilderness. They're not worth much—what would they fetch at auction? why, not five shillings, but then we don't want to lose them, they does very well for us." The rent of this place was £3 10s. per annum. The poor people had got in arrears with their rent, "but the landlady," said the man, "is a good 'un, and don't press us."

Another case, of which I was informed by the Rev. Mr. Baddeley, the rector of Halesworth, was one in which misery and wretchedness of every kind appeared to culminate. The rev. gentleman stated that he was called upon to visit a poor woman, who was suffering severely from a cancer. Beside her, on a heap of rags on the floor, lay her unmarried daughter, eighteen years of age, moaning in the pangs of labour. Upon his next visit the mother had expired, the daughter had become a mother; and, huddled together in the upper room, lay the corpse, the living mother and her child, seven other children, and the husband, who had been for some time out of work.

I could enumerate cases to a still greater extent, which would show the disgraceful condition of many of these double-roomed cottages in the rural districts. There are many of a similar character to be found at Rattlesdeen, at Metford, at Ranshold, at Sutton, Selland, Gipping, Dalham, Woodbridge, and many other places which I have visited. Enough has, however, been stated to show their general character.

But it is not only in the rural districts that these wretched dwellings are to be found. Clustered together in many of the larger towns in the agricultural districts similar abodes are to be met with. At Stowmarket, at the back of the Fox Inn, is to be found a close, confined, and badly-paved court, called "Cabbage-square." In company with the Rev. Mr. Freeman, of Stowmarket, I visited the place. Three sides of the court were occupied by twelve houses, there being four on each side; the fourth side was a dead wall, which formed the back of the premises of the Fox Inn. There were no gardens to the houses, back or front—no water, and one common privy to the whole of them. The interior of some of the houses which I visited presented an appearance of wretchedness and misery quite in keeping with the dreariness of their external appearance. The entrance to the court was through a narrow and dirty passage, in which there was scarcely room for a couple of people to walk abreast. Mr. Freeman informed me that the place had been recently greatly improved, under the

orders of the Sanitary Board, and that previously to that time it was almost impossible to approach it, in consequence of the heaps of filth and ordure with which it abounded. The rent of each house was 1s. 7d. per week. In the town of Bury, which bears a high and deservedly good character for its general cleanliness, similar haunts are to be found. Mr. Brown, an able and intelligent superintendent of police in the Bury district, accompanied me to a place called Hong's-lane, than which a more miserable-looking place could not be conceived. It consists of a row of red brick houses, twenty-six in number, which, though they have been only erected four years, are already in the most ruinous condition. The front walls of the houses are in many places cracked from top to bottom. There is scarcely a window in the whole row which has not some of its glass broken; some of the windows are stopped up with rags of all colours and shades, others have pieces of paper pasted over them. In front of the houses is a dead wall, extending the whole length of the buildings to the height of the upper windows, totally excluding the current of fresh air. The place is approached at each end by a low and narrow archway, through which, while stooping, you have to pick your way amid the filth and garbage with which it abounds. It is the resort of prostitutes, poachers, thieves, and others of the worst character. At the back of the row, and extending the whole length, was a wall equal in height to the top of the windows of the lower room. The distance between the back of the cottages and the wall was about three feet, and this space was used as a general receptacle for filth and refuse matter. At each end of this filthy tube, for I can designate it by no other name, was a privy, the two being used in common by the whole of the inhabitants. The first den which I visited was in the possession of a labouring carpenter. From some injuries which he had received he had not been enabled to do any work for the last fortnight. He was a widower, and there were six children at home. The eldest boy, twelve years old, appeared, as he walked, more like a moving heap of rags and tatters than anything bearing the semblance of a human being. How his rags were kept on was a mystery which I believe none could solve; and if they had been taken off, it would have been impossible for the owner to have put them on again. They were never taken off; in fact, he slept in the rags, as did his other brothers and sisters; for in the upper room there were no beds, no sheets, no blankets, no counterpanes. Three heaps of shreds, more filthy, if possible, than those upon the backs of the wretched children, and more loathsome from the vermin which they harboured, showed the spots where each group of this miserable family sought in sleep the short-lived bliss of unconsciousness of misery. The fœtid smell of the room was overpowering.

Three doors removed from this was another place, which we visited. Its external and internal appearance were even worse than the one just described. Of the twelve small panes of glass in the upper window, five were broken, and in the lower one about as many. Upon my entering the room in company with the superintendent of police, a

woman, miserably clad in an old gown, with apparently no other article of clothing upon her, and with a young child three months old in her arms, addressing my companion, said, "You are not come for Tom again, are you? 'Cause, if you have, he is'n't here—that's all I can say." Having satisfied her upon that point, and explained to her the object of our visit, we learned from her that her husband was at work on the railway near Diss; that he sent her 8s. a week; that she had seven children, the youngest being three months old. "I can't get no meat," she said, "only once a-week; to-day we had a herring and potatoes for dinner. Sometimes I buys a sheep's head and pluck, and that lasts me nearly all the week." We requested permission to see the room upstairs, but she objected to it, telling us that "it wasn't fit for no Christian to see." Judging from the condition of the room in which we then were, it must have been miserable indeed. The only articles of furniture were two very old chairs and a small table; on the shelf over the fireplace, a broken basin; on the window-sill, a stone bottle and a few dirty cloths.

I shall only detain the reader by a description of one of the cottages next in point of superiority, many of which are greatly superior to those that it has been my painful duty to describe. They consist of three apartments, and in some cases, by means of a small out-house attached to the dwelling, they are made to comprise four. Vast numbers, however, of them are miserably built. We will take one of this class situated at Barrow-green, a place distant about five miles from Bury. There is a group consisting of about thirty cottages, situated at the lower end of the green or common. Along this side of the common runs a large ditch, over which you pass to arrive at the group. One row of six cottages faces the common, in front of which is a piece of ground, divided, by means of a number of shattered fences, into as many pieces, of about four yards long and three wide, as there are cottages. These plots of ground, dignified by the name of gardens, are, in point of fact, little more than enclosures for the reception of the filth and refuse of each cottage. At the back of the buildings is a privy, which, like many others in this part of the country, is common to a number of cottages. Having taken off my hat, which in visiting a large number of these cottages is a mark of homage which you are physically compelled to pay if you wish to obtain an entrance, I found myself inside one of a class of cottages called three-roomed ones. It was Saturday, and the woman, with her little girl of nine years of age, was busily engaged in washing and cleaning the dwelling, their damp and humble abode. Against the back wall of this cottage a small outhouse had been erected, which was just large enough to contain a bed, and was lighted by a small window, which looked out on the fields. Immediately underneath it—the outer wall of the outhouse forming, in fact, one of its sides—was a ditch of about two feet in depth. "I can't have that window open," said the poor woman, "in summer, because if I did I should be *pisoned*, it do stink so. The place is always damp with it, and I'm never without the *rheumatis*." She hereupon

showed me a portion of her arm, the sinews of which were shrunk, and when attacked with cold or rheumatism she was unable to make any use of it. Her son was a pedlar, and the upper room—or rather loft, for, like most of the upper rooms of these cottages, it was immediately under the thatch—was used as a store-room for his wares and trinkets. She had lived in the place thirty years, had had three different landlords, none of whom had expended a farthing upon the premises. "It is almost impossible to keep the place clean. Look here," she said, pointing to the different places from which the plaster and rubbish were continually falling, "as fast as I sweep it up, it comes down again." Her husband was in constant work, but could not, she said, "afford to buy a pig, even if they had a place to keep it in. They used to grow a little *sauce* (potatoes) upon the common, but they won't let us now. Sometimes we can manage a goose, when we can't a pig, because that'll run on the common; but they're a goin' to enclose it, and then we shan't be able even to do that. They don't encourage poor families as they ought to do here, but it is not much matter to me. I don't think I shall be here long. My eldest daughter is at Port Philip, and I take on very much about it; she was married very early, against my will, and was not *yoked* very pleasantly either. I have many a hearty cry when I think of how I have brought my family up." I left the poor woman in tears. There was a tale of real woe, I doubt not, to be gathered; but the poor woman was so affected that I declined to pursue the subject further.

The next subject immediately in connection with the dwellings of the labourer is that of rent. It is impossible to arrive at anything like a fair average of the rent paid for the cottages, as it varies so much, not only in different districts of the county, but, in some cases, actually within the same parish. At Buxhall, the cottages built by the Rev. Mr. Hill let for £3 3s., while close by him, and in the same parish, there are others, not containing a greater amount of accommodation, which let for £6 and even £7 per annum. At Woodbridge there are a number of wretched one-roomed cottages, the property of the Rev. Mr. Taylor, a dissenting minister, the rent of which is 1s. 4d. per week, while in many other places cottages of a similar character can be had for 9d. and 1s. Upon the estate of Sir E. Kerrison a comfortable four-roomed cottage, with a rood of land, lets for £3 10s.; while there are several cottages close by his estate which, without any garden, let for £4. As a general rule, it may, perhaps, be stated that in the neighbourhood of towns the rent of the cottages is higher than in places further removed from them; and it will also be generally found that the cottages built by gentlemen of property upon their own estates let for a considerably less sum than those built by private speculators. One great cause of the enormously high rents which are paid by the poor people is, that in a great many cases the cottages are built by persons of very small capital. A tradesman in a country town, as soon as he is able to scrape together a little money, forthwith begins to look about for a piece of land upon which he can build one or more cottages; but through his

not having fully counted the cost, he finds that before the building is completed his small capital is run out, and he is compelled to borrow money at a high rate of interest upon the mortgage of the cottages—and thus, having interest to pay upon the borrowed money, as well as to obtain a return for his own investment, he is forced to obtain the largest amount of rent he can from the unfortunate tenants. The number of cottages which are either in this situation, or which have fallen into the hands of those who had advanced money upon them, is very great.

Generally speaking, there appear to be no universally recognized conditions upon which the tenant holds the cottage. In some, but comparatively few cases, the repairs are done at the expense of the landlords. In the majority of cases the tenant bears the cost of repairs, or puts up with the want of it. Upon the estates of Sir E. Kerrison and other gentlemen the landlord charges himself with the repairs. Upon the Culford estate, the property of the Rev. E. Benyon, very strict rules are adopted with respect to the tenantry. The following is a copy of the regulations to be observed by the tenants on his estate:—

"REGULATIONS TO BE OBSERVED BY THE COTTAGE TENANTRY, AND THOSE RENTING GARDEN ALLOTMENTS ON THE CULFORD ESTATE:—

"1.—Each occupier is to keep his cottage, with the buildings belonging to the same, clean and in good order.

"2.—Any injury committed to the walls, doors, oven, or windows, or upon other fixtures, as locks, grates, cupboards, shelves, &c., to be made good by the tenant; reasonable use and wear thereof being allowed.

"3.—All fixtures that are actually the property of the tenant, are, on his leaving the cottage, to be offered to the Rev. E. R. Benyon, at a fair valuation; and should he decline the purchase, they must be removed before the tenant's quitting the premises, and without injury to the walls, or any part of the buildings.

"4.—No person, in addition to the immediate family of the tenant, is permitted to reside in any cottage without a written authority from the steward of the estate.

"5.—No gleaning corn is allowed to be threshed in any cottage.

"6.—The gardens are to be cultivated with the spade, and on no account to be ploughed.

"7.—No occupier is to underlet his garden, or any part of it.

"8.—All fences, gates, posts, rails, &c., are to be kept in repair, and the hedges neatly trimmed, by the tenant.

"9.—No horse, pony, or donkey is to be kept without a written authority, as aforesaid.

"10.—Should the Rev. E. R. Benyon, or his steward, notice any tenant neglecting to conform to these regulations, they will be compelled to remove him from possession of his cottage and garden, by notice, according to the covenant in the agreement under which he holds possession.

"As the principal object desired by the Rev. E. R. Benyon is the welfare and comfort of his

tenantry, it is hoped they will see the advantage that must arise from conducting themselves respectfully and orderly, and keeping their cottages and gardens as directed; a proper attention to which will alone secure to them their respective occupations."

The observance of these regulations is enforced by a written agreement signed by each tenant. If the tenant refuses to leave when called upon to do so, the landlord has the power, under the Small Tenements Act, of forcibly removing him, upon application to the County Court. I was informed, however, by his steward, that it was very rarely that this power was called into requisition, the tenants, generally speaking, being very careful to fulfil the terms of the agreement.

One of the great evils of which, perhaps more than anything else, the poor people complain of, is that of their being compelled to pay the parish rates in addition to the sum they pay for the rent of their cottages. Speaking to a poor woman who resided in a cottage of her own near Woolpit, and whose husband was in almost constant work, she said:—"One of the most cruellest things as I know is to make the poor dear people pay the rates. I'm better off than some of 'em because I don't have no rent to pay, but there's a *hape* of people that can't afford to pay it nohow. There's my poor daughter has to pay 2s. 9d. or 2s. 3d. every time they call for a rate; and I'm sure they're often obliged to go without wittles to pay it. It's a cruel thing—it makes the poor dear people run in debt for things they ought to pay for, and put things in their minds that they never thought or dreamt on; and I hope and pray some good gentleman will take the matter up and write to the Government, and let 'em know how the poor labourer is put upon. Everything comes from them—if they war'n't to work what could the rich folks do? They'd starve, and yet they makes him pay the rates. Oh, it is a cruel thing, indeed it is. The poor dear labourer has to go a *throshing*, tearing his poor inside out, and can't get nothing when he's out but his bit of bread and a drop of water from the ditch, without even a crum' o' pork; and then when he comes home, why all that's for him is to go to the pump for a *scoop* of water, or have, perhaps, a little *wake* tea, or boiled water with a crum' o' sugar in it—perhaps not that."

The wages of the labourer vary rather considerably in different portions of Suffolk. Previously to the harvest the maximum paid to field labourers was 9s. a-week. In many other parts, principally in the western division, the wages were not more than 8s. a-week. Since the harvest, however, there has been a very general reduction of 1s. per week, and in the neighbourhood of Clare and Cavendish the farmers had very generally come to a resolution to reduce the wages to 6s. for married men, with a proportionate reduction in the wages of the women and unmarried men. But although 8s. or 9s. per week is the nominal amount of wages paid to the labourers it is in fact somewhat more than that. During "hay time" and harvest an increased rate of wages is paid. During the hay-making season the labourers get in some cases double wages, in others about 50 per cent. more; that is to say,

labourer who may have previously been receiving 8s., will then make 12s. per week. In addition to the money increase, they have also what they call "fours," which consists in having bread and cheese and beer at four o'clock. During the harvest month, too, the men generally get double wages; or in cases where it is done by piece work, a number of men join together and take so many acres, which they undertake to reap at a certain price. In such cases the men will earn upon an average from £3 to £5 during the month. A custom prevails in many parts of the county of giving the men three bushels of malt at the close of the harvest. During the harvest, in addition to their wages, the men are allowed what is called "a taking supper," which is a supper given to the men at the time of making the agreement; the "half-way supper," when the work is about half completed; and the final supper, called the "harvest home," when the grain is carted and stacked.

The appropriation among the labourers generally of their earnings is usually, that the amount earned in harvest pays the rent—the hay-making wages go for clothes—and the produce of the gleaning pays the shoemaker. In too many cases, unfortunately, this mode of distribution cannot be adhered to. The majority of the labourers have nothing to do during the winter; and where they can, they are compelled to run in debt for the necessities of life, and the extra money earned in harvest too frequently goes to pay off "the old score." A few extra weeks of wet weather, or sickness in the family, is quite sufficient to destroy all their nicely-adjusted financial schemes. If you ask the labourer how he manages to pay his rent, live, and clothe himself upon his wages, the usual answer given to you will be something of this sort. "Why, zur, I don't know how we manages; if you wur a labouring man yourself you would know, I *dur* say." There can be no doubt as to the truth contained in the latter portion of the answer, but as to any information you can get upon the subject, it is almost out of the question. It is, in fact, a mystery to themselves, and it is no wonder that they are unable to explain it to you.

But the wages as given above include only those paid to married men; a custom very generally prevails of giving the unmarried considerably less than the married men. Few of the unmarried men get more than 6s., the majority but 5s. per week; but, so far as the value of the labour obtained by the farmer is concerned, there can be no doubt that they are able to get a much larger amount of work from the young unmarried men than from the married and older ones. And in this point of view it is manifestly unjust to make a difference in the wages of the two classes. Besides the injustice of the proceeding, the policy is of the most doubtful character; by giving a young man of twenty years of age and upwards a lower rate of wages than they would give to one who was probably his junior, but who could call himself a married man, they almost compel them in self-defence to marry early, and, in the great majority of cases, additional burdens are, in consequence, thrown upon the parishes. Accustomed up to the period of his marriage to live under the roof of his parents,

allowing them a portion of his earnings for his food and lodging, and when thrown out of work having his parents to fall back upon—which in a great many instances is the case—he knows nothing of the extreme privations which others less favourably situated than himself have to endure. He is married, however; he is entered upon the farmer's list as a married man, and forthwith his wages are raised from 5s. or 6s. to 8s. or perhaps 9s. His wife may or may not possess those peculiar qualities which are indispensably necessary to the labourer who desires to make both ends meet. For the first five or six years of their married life they are subject to the greatest privations. The expenses of a family of four or five children have come upon them, and the earnings of the husband, even if in constant work, are insufficient for their support. The children are too young to earn anything wherewith to assist the general stock; the wife is unable to earn anything, because the family is too young to be left. Sickness, perhaps, comes upon them; the husband is unable to work; and finally the union receives the whole of them; and the farmer who grudgingly paid him his paltry pittance of five or six shillings a week as an unmarried labourer, has to reap the fruits of his injudicious economy, by supporting the labourer, with his family, in a state of idleness. Many instances of this have come under my own knowledge.

The wages paid to boys under sixteen seldom exceed 3s. per week, and the women seldom earn more than 5s. I have not met with any case in which a higher rate than that has been paid; and for one who is paid so much there are hundreds who receive less.

The diet of the labourer may be summed up in two words—bread and potatoes. Meat is comparatively unknown to them. "I can assure you, solemnly," said a labourer to me, who was in pretty constant work, "I don't get a bit of *mate* from one month's end to another." "Last Sunday," said a poor woman, whose cottage I visited, "we had a bit of pork that I gave 9d. for; it was the first bit that we'd had for many a long week. What we didn't eat for dinner on Sunday my husband took with him when he went to work on Monday." "Lor, bless you," said another, "we shouldn't know ourselves if we got meat." "My son," said the poor woman, whose residence I have described at Barrow, "sometimes buys a pig to sell again, and then we has his head." A poor woman residing at Hare-court, Bury, whose husband earned 8s. a week at a maltster's at Fornham, and who was necessarily absent all the week in consequence of the distance from his home at which he was compelled to work, gave me the following as their weekly expenditure:—

	s.	d.
Rent	1	6
One stone of flour	1	8
Baking	0	3
A piece of pork on Sundays ..	0	9
Potatoes	0	1½
¼ oz. tea	0	1½
¼ lb. sugar	0	1½
¼ lb. butter	0	3

Total, ... 4 9½

leaving 3s. 3 $\frac{1}{2}$ d for the support of her husband during the week, out of which he had to pay 1s. a week for his own lodging. They had no family, had lived twenty-seven years in the same house, and owed only one week's rent. "We never gets pork, except on Sundays, and then my husband is at home. I don't think about none all the week; and it is no use a thinking about it if you can't get it," said the sharp little woman, resuming her work at making flour sacks, at which she informed me she could "arne," if she got up before daylight, and worked all day, the remunerating sum of 6d.

(To be continued.)

PROFESSOR JOHNSTON.

At a recent meeting of the East of Berwickshire Farmers' Club, Professor Johnston, recently returned from America, at the request of his friend, Mr. Milne, of Milne-Graden, delivered the following address, which we have much pleasure in laying before our readers:—

I will briefly refer to some points which came under my observation in that part of the country which I visited. First of all, as to the state of agriculture in the northern parts of America, in our own provinces, and in New England, with which we are ourselves more familiar, when I tell you generally that the state of agriculture in those parts of America is what the state of agriculture in Scotland probably was 80 or 90 years ago; and when I tell you that in some parts of New Brunswick they are very nearly in the precise condition in which Scotland was 120 years ago, you will have an idea of the state of agriculture in North America. The system of agriculture is no farther forward—it is exceedingly far behind. They are not even acquainted with the improved methods of farming, or the improved implements which are now in common use in this country; while the increased facilities which Mr. Milne would still farther introduce have never even been heard of by them. Now, in regard to this state of things in the whole of the northern part of America, go as far west as you like, and as far south as you like, the same general description applies to the whole. Now, the next question is, how has this state of things been brought about? You are probably not all so well acquainted with the state of agriculture in this country 100 or 120 years ago as I have found it my duty to make myself; and at the time to which I refer, I allude not only to the state of great ignorance in regard to the cultivation of the soil, but to the state of exhaustion in the soil itself. So in referring to the present state of agriculture in America, I refer to two considerations—the condition of mind brought to bear upon the

When she was mending sacks, "she only got a halfpenny a piece," and they took her almost as long to mend as a new one did to make. She "couldn't mend more than four dozen in a week."

Having thus dwelt with the condition of the labourer, with regard to his dwelling, his wages, and his diet, I propose in my next to give the reader the result of my enquiries with respect to the numerous incendiary fires which have recently taken place in the county, with some account of the wages and condition of the labourers in those localities where the fires have occurred.

cultivation of the land, and the state of the land itself. In regard to the cultivation of land in America, its condition arises from a variety of causes, and very few considerations will enable you to understand how it has come about. If you ask yourselves to what class does the majority of emigrants belong, you will have no difficulty in coming to a conclusion. Look at the great crowds of people who go from Ireland, from the Highlands of Scotland, and the hundreds of thousands proceeding from the great towns of England and Scotland—ask yourselves of what class they consist—what amount of intelligence and agricultural knowledge they possess; and in the answer to this you will at once find the key to the state of the land in the whole northern part of America. The people who first settled in America knew nothing of agriculture, and their descendents have generally copied the habits of their predecessors. Thus it came that their sons knew nothing; out of the way of books—out of the way of instruction, supposing them to have even read books which gave instruction, they would have made very little progress; but we must suppose them not to have had an opportunity of gaining knowledge, and therefore instead of advancing, they have retrograded in agricultural knowledge and practice. Now, what has been their procedure—by what kind of procedure have they brought about the state of exhaustion to which the soil has been reduced? Of course, in speaking of the exhausted soil, I do not refer to the virgin soil which has never received the plough or the spade, but to the soil under their cultivation, and which they are now exhausting. When I tell you how the land is cultivated, you will understand how this exhaustion has been produced. The forest is in the first place cut down and burnt, after which the ashes are scattered, and a crop of wheat and oats is sown. When this crop is cut down another is sown; but they do not always remove the straw—

they do not trouble themselves with any manure. The second year they sow it again and harrow it, and generally take three crops in succession. When they can take no more out of it, they either sow grass seeds, or as frequently let it seed itself. They will then sometimes cut hay for 12, 14, 16, 18, or 20 years in succession, in fact as long as they can even get half a ton an acre from it. And you may suppose what is the natural fertility of the land when they are able to obtain as much as three or four tons per acre at first, and go on cutting it for 12 years. They will probably have two tons an acre during all that length of time. The land is then broken up, and the crop of oats taken, then potatoes, then a crop of wheat, and then hay for 12 years again, and so the same course is repeated. Now this is the way in which the land is treated—this is the way in which the exhaustion is brought about. This exhaustion exists in Nova Scotia, New Brunswick, Lower Canada, in Upper Canada to a considerable extent, over the whole of New England, and extends even into the state of New York. The next inquiry which you will make is, what steps are they taking to remedy this state of things? Are they doing anything to bring back the land to a productive condition? and, in order to do this, are they taking steps to put any knowledge into the heads of those who cultivate it? Now, on those points I am happy to say that I can speak very favourably. They possess the spirit of their forefathers, and having become conscious of the state in which agriculture really is, they are endeavouring to improve it. But you will ask, what inducement have they to make these exertions? They grow corn enough—they have no want of agricultural produce as we have; but when I tell you what is the condition of New England in reference to the western States you will understand. All the new States—all the virgin land, when it is cultivated, yields a crop for little or nothing, but it cannot yield by any means a large crop. In the state of Michigan, between Lakes Superior and Erie, the average produce is not 12 bushels an acre, but it is got for nothing. In New Brunswick, which is very thinly populated, I was told that 10 bushels an acre paid well; but the produce is not large. In the western States they are enabled to produce it very cheaply.

Mr. Hay.—What was the value of a bushel of wheat?

Professor Johnston.—At the time I was there the price varied from 60 to 80 cents a bushel, *i.e.*, 100 cents being 4s. 4d. In the extensive western States, and part of New York, where it is shipped to England, the price varies according to the distance. Now, the condition of things in the western States in reference to England is precisely the same as the

condition of England in reference to the wheat-producing countries of the Baltic. The condition of the farmers is exceedingly bad, and in Maine I was informed that they were all in a state of bankruptcy. The land is all mortgaged, which hangs like a mill-stone round their necks, and is worse even than the state of the farmers in this country. They are thus unable to compete with the western parts of New York or Lake Ontario. You have all heard of the famous wheat of Genesee, where the land is more fertile than in any part of Great Britain; and I learned there that they are laying the land down to grass, because they cannot afford to grow wheat. As a remedy for this state of things, they are establishing agricultural societies in the different States, and the legislature is providing funds to support these societies, and for the diffusion of knowledge. The central society is in Albany, and to it the different branches send reports. The legislature publish these in one thick volume, and circulate 20,000 copies gratuitously throughout the States. This central society asked me to give their annual address at Syracuse, and a course of lectures before the Legislature at Albany. These lectures are to form part of this year's report; and the Legislature have resolved to print an additional 20,000 copies, making 40,000 altogether, and to circulate them gratuitously through the different States. Let us now come to another point of great importance, and to which you would perhaps like me to advert, *viz.*, what will be the effect of an improved condition of agriculture in America upon us, what influence will the growth of wheat in the States have upon us, or what influence is the progress in agriculture, consequent on this great desire for improvement, likely to have upon the state of agriculture in Great Britain? In New Brunswick, New England, Vermont, New Hampshire, Connecticut, and New York, the growth of wheat has almost ceased; and it is now gradually receding farther and farther westward. Now, when I tell you this, you will see that what I believe to be the case is really the case—that it will not be very long before America will be unable—in fact the United States are unable now—to supply us with wheat in any large quantity. If we could bring Indian-corn into general use, we might get plenty of it; but I do not think that the United States need be any bugbear to you. I believe the great source of competition you will have to contend with is the Baltic and the countries on the borders of the Black Sea. Now, in regard to the other point, *viz.*, what effect will the desire for improvement in agriculture have upon the agriculture of this country, it ought to stimulate us to still greater exertions. Sure I am, that with proper exertion, we will always keep a-head of them. There is as good blood in this country as ever went

out of it. I hope English and Scotch heads and hearts will not become languid and dull on a matter of such moment as this, but that we will continue to beat them, as I am sure, from what I have seen,

that we are able. What the Americans can do well we ought to be able to do better. (The learned Professor sat down amid great applause).

THE DEEP DRAINAGE QUESTION.

SIR,—It is, perhaps, known to some of your readers that I have always taken a most decided part against a system of drainage four and five feet deep, forty to fifty feet apart, with the greatest fall under all circumstances, and on the very retentive clay subsoils, not surcharged with under-water, treading the clay again on the pipes. I have also gone so far as to say that there are certain tracts of grass land that may be over drained, and that some peaty soils may be rendered almost useless from the same cause.

I think there are few persons aware that such a system as this is recommended in the present day; but the following extract from a report and specification before me, for the expenditure of a sum of about twelve thousand pounds, will show that such is the case. The soil on the estate is described as consisting of "moory land, alluvial soil, cold tenacious clay, peaty soil, a portion of good loamy land, all resting on a substratum of clay; impervious to water; also a portion of land, resting on a porous bottom, but which is capped with yellow clay, impervious to water. The injury is from springs and surface water. Over the whole surface parallel drains, *four feet six deep, forty-five feet apart*, to be filled with eight inches of broken stone, or, what I recommend (says the report), *one-inch pipes, and three-inch for all the sub-mains.*" Now, this is in a part of Ireland where about twice as much rain falls as in England. But this is not all. In the *Quarterly Review* for December there is a long article on drainage, in which the writer (no one can tell who he is) tries to make it appear that all plans for drainage, except the one adopted by Mr. Parkes, are perfectly absurd. Now, how does the writer review an article of mine, "On the failure of deep draining on certain strong clay subsoils, with a few remarks on the injurious effect of sinking the water too far below the roots of plants in very porous, alluvial, and peaty soils," that appeared in the 9th vol. of the *Journal of the Royal Agricultural Society of England*? First, by making it appear my article is simply on the failure of deep draining, as he stops here, leaving out the most important part; and then goes on to make out that I am one of the most miserable shallow drainers, and, like all others who do not agree with him, "entirely ignorant and hopelessly absurd."

One short extract from my article will show that the writer is entirely ignorant, or a most unfair reviewer—*Journal of the Royal Agricultural Society*, vol. ix., p. 237.

I wish to have it clearly understood that I am not a partizan of either faction, am not a deep, a shallow, or a medium drainer; but consider each of the several practices, exclusively advocated by various experimentalists, proper to be applied in individual cases. "For deep draining I am strongly an advocate in all soils injured by under-water."

The article in the *Quarterly* will not be allowed to pass unnoticed by me; but I have only just returned from a remote part of Ireland, and only saw it within the last few days.

The subject of draining is of such deep importance to the owner, and more particularly the occupier of wet land, as in many cases the latter will have to pay a per centage on the work, whether it answers or not, that I think the question ought to be decided by the thorough practical men in the country whether it is right or whether it is wrong (as I strongly recommend)—

1. That one-inch pipes should not be used.
2. That on strong clay subsoils, not surcharged with under-water, three feet drains, at moderate distances, in preference to four and five feet drains at wide intervals.
3. That on these retentive subsoils the clay should not again be returned on the pipes, where the injury is not from under-water.
4. That all springs should be treated as such.
5. That the drains should not always be placed with the greatest fall, particularly in very hilly land.
6. That care should be taken not to overdrain some descriptions of grass lands and weak peaty soils.
7. That care should be taken before commencing to drain an estate four feet deep all over, to calculate the expense of outlets to accomplish this; and what the annual expense of keeping them in repair will be; and then see whether a three feet or three feet six inches drainage would not answer every purpose.
8. That it should be well ascertained before taking out the extra foot after three feet, whether such excavation will pay, as there are soils where

the three feet will have just the same effect, and save a heavy expense.

Now I am most anxious to get communications from all practical men on this subject, and will undertake to make public all communications, whether for or against my own views, in England, Ireland, and Scotland. We cannot grasp the whole subject at once but by getting a statement of facts on the points I have named. Such statements that have appeared in the *Quarterly*, as that no drain should be less than four feet—in strong soils deeper; that whether the small pipes will carry the water is a mere question of capacity; that in all soils the water-table within less than four feet of the surface of the land is prejudicial to vegetation; and that the deep system of draining, at twelve yards apart, makes the strong soils in such a state as to allow the rain-water to filter through them to the depth of the drains, will either be proved to be correct or not.

All communications addressed to me shall be faithfully looked into, and reported to the agricultural world.

Yours, &c.,

WILLIAM BULLOCK WEBSTER.

Imperial Hotel, Dublin, Feb. 13, 1850.

P.S.—I cannot let one short sentence in the article on drainage, in the *Quarterly*, go unnoticed, even now. It is this:—"Mr. B. Webster not being able to deny that deep drains in such soils (this is speaking of the *very* retentive clay sub-soils) carry off water, at first hazards the childish assertion that, after a few years, it ceases to find its way to them."

Now, I not only hazard the childish assertion, but I tell the writer of the article in the *Quarterly*, that I will hazard the risk of paying all his expenses into Worcestershire (I have no idea where he lives) and back, if he does not find what I have stated on that point to be perfectly correct, on the farm of G. Bayless, Esq., Prospect House, near Evesham.

I tell him again, he will there find deep drains, in the strong clay, so useless, that the land has had to be redrained shallow.

Perhaps the time of a man who writes articles for the *Quarterly* is also valuable; I will, therefore, agree to pay him for his time, should my statement prove incorrect.—Mark Lane Express.

APPLICATION OF STEAM POWER TO THE GENERAL PURPOSES OF AGRICULTURE.

Some years ago the Highland Society of Scotland offered, in several successive competitions, a prize of £100 for an account of the successful application of steam power to the general purposes of agriculture; but so unproductive, so fruitless was the offer, that, if we mistake not, it was withdrawn: and though the idea of an application of steam power to the farm-yard operations of thrashing, chaff and turnip-cutting, bone-crushing, wood-sawing, and similar operations, is quite common, and generally understood, there has so far been no complete and universal application of steam to the entire motive and mechanical operations of the farm. A writer in a recent number of the *Farmer's Magazine* puts the difficulties of this matter in a clear and apposite light; he says—"We have seen, one after another, steam-engines for tilling the land and other general farm operations, but they seemed to fail in producing the desired effect. And why, we would ask, if the manufacturers can economically avail themselves of the use of steam-engines, why may not agriculture derive an advantage at least approximating from the exercise of the same vast motive power? But it must be borne in mind that the farmer has always one natural law to contend with, from which the manufacturer is free. The latter may, in a building of comparatively small

area, carry on a business involving the expenditure of tens of thousands of pounds; nor will any reasonable increase of business invariably involve a great increase of premises. But after a certain point is attained in farming, there must be a vast increase of area to increase materially the produce; and hence to embark a very large capital implies a very large employment of power; for distance from the motive power always implies waste of that power. Nor can the farmer have locomotive power but at a great sacrifice, and at a great loss; and the whole farm cannot be made into roads adequate to convey the ponderous locomotive, and the soil is by far too unstable and yielding to admit of its passing over it without them. This has been the real barrier to the general employment of engine power to agricultural operations, and how far the genius of man may in time totally overcome it seems at any rate questionable. Indeed, it is difficult to conceive any plan to effect it but the engine laying and taking up its own railway, and this was attempted by Mr. Heathcoat some years ago; and though it was an experiment of the highest interest, and manifested great skill and power, they were not able to make it either generally applicable, nor even useful, in that particular case—one indeed specially adapted for its employment. Still we would not limit the

powers of man, nor doubt the possibility of what is confessedly within their range, but wait until some fresh mind is brought to bear upon the point, and see what new ideas can produce on a subject so complicated and so beset with difficulties." (vol. xxxii., p. 9.) The subject, however, is revived by the experiments of Lord Willoughby de Eresby, whose plans and proceedings are detailed in a pamphlet published, we believe, by Ridgway, but which has not been sent to us in the usual course, and which we have not therefore seen; but as a friend of ours was himself present at the experimental trial, we are able to place before our readers an account of the operation.

The plan, as we understand it, is first to have a railway laid in the centre of the field intended to be ploughed. On this a locomotive steam-engine—"The California"—runs, and to the right and left of it four ploughs, two on each side, attended or followed by as many subsoil ploughs, traverse the land. At the end of the land to be ploughed is a frame, fastened to the ground by an anchor, and to this is fixed the rollers, round which the endless chain is wound, which connects the plough with the steam-engine.

As we further understand it, one set of ploughs is running idle while another is at work, so that the man who guides them will be necessarily walking idly also, and thus one-half of the whole manual labour will be lost, as far as holding the plough is concerned. This, however, is a matter of detail, easily remedied by one of Lowcock's ploughs being substituted for the common share.

The railway is described as light and portable; but as the laying of such a contrivance must be both expensive, and require a long time to effect its removal, we think it very probable that some more facile plan will have to be adopted. The great objections to steam ploughing consist of the following:—

1. The softness of the cultivated soil, and the consequent objection of the great weight of the engine. Lord Willoughby's engine, we believe, weighs but $3\frac{1}{2}$ tons, but if the railway is temporary only, the land it occupies will have to be ploughed and cultivated after the ordinary steam ploughing is effected.

2. The large sized fields only can be available for this operation. His Lordship's Lincolnshire estates, however, afford abundant opportunities for exercising it with "ample space and verge enough."

3. The great loss of time in arrangement and adjustment, and the impossibility of a full employment of the labourers occupied. The engine and frame have to advance three feet on the completion of four furrows, so that, if we rightly comprehend the process, the anchors have to be unloosed; the engine moved onwards; the same of the carriages

on which the endless chain is wound. And who is to effect these operations, and what the ploughs and men are doing during this operation we are not told.

4. The great distance and loss of power between the motive power and the source of traction, involving great waste of the impelling medium. Lord de Eresby's has a chain 150 yards in length, and is capable of being shortened, and, of course, lengthened, if it should be requisite.

5. The expense is among other difficulties attached to ploughing by steam. The noble experimenter reasons that the steam-engine and its ploughs will do as much work in ploughing and subsoiling as 16 ploughs held by the same number of men, and double the number of horses. The engine is said to be worked by eight men, and one horse only is requisite to carry the water to the engine. A saving is therefore made out, of 31 horses and eight men. Five shillings per day is said to be the utmost expense in coals, and this with the interest of the engine, and wear and tear, which will of course occur also in the horses if they were used, shows a very great reduction in the expense of cultivating the land. But we fear the "working expenses" are not all estimated in this amount. The railway cannot be laid without time and expense, and ploughs will be necessary after all, to finish the headlands and other work which we fear the steam ploughs will leave undone. We would not for a moment underrate the value of experiments of this kind, and made by a nobleman of capital, who can command the best mechanical skill, it is in good hands. We hope nothing will deter his lordship from persevering, until the great difficulties we have stated are mastered; and he deserves the thanks of the community at least for his efforts, though we can hardly hope that, so far at least, they have succeeded.—Gardeners' and Farmers' Journal.

A CHALLENGE.—At the Meeting of the Bedfordshire Agricultural Society Mr. Samuel Bennett observed that—

"Col. Gilpin had referred to observations made on the Bedfordshire farmers at a meeting in another county—he believed Northamptonshire. He would say, as an individual, he would meet any other individual in Northamptonshire; or he would make one in ten or twenty neighbours to meet them in farming, ploughing, or anything else, for any sum of money. The remarks in Northamptonshire could not injure them, and he hoped his challenge might reach their ears or meet their eyes. Mr. Pain said he would make one in ten to meet them; for bad as they might be thought, Northamptonshire was half a century behind them."

We shall be happy to announce when the challenge is accepted.

IRISH AMELIORATION.

A thousand small but co-operating causes have combined to effect that gigantic disaster—the disorganization of Ireland. Class disseverance—individual recklessness—local quarrels—personal incompetences—family feuds—the avarice of one man, the hospitalities of another, the extravagancies of a third—ignorance of the law on this side, too sharp practice in its technicalities on that—the best and the worst feelings of human nature—the blessings and the curses of human existence—the spirit of chivalry, the impatience of inaction, the aspiration for liberty, the admiration for genius—the gentleman's honour and the peasant's industry—education and commerce, religion and the potato—have each and all contributed their element of discord or their agencies of impoverishment to produce a calamity of such colossal proportions. All those varieties of temperament which in other countries serve to secure workers for every mine of production, and fill every active career of life with energetic competitors, in Ireland seems but to perpetuate turbulence; and every source of national wealth serves but to provide a field of spoil, around which Irishmen congregate in order to dispute or to destroy.

The evil that has thus grown up, not as a whole, or in a night, cannot in a day be overcome. Regeneration can come for Ireland through no one act of preventive grace. No wave of a fairy wand can cover her surface with smiling harvests and a contented population. Her "goal of happiness," if reached at all, will be attained by "taking steps," and not wings. Stroke by stroke, and thread by thread, must the forest of her difficulties be cut through, and a smoother web of destiny woven for her hereafter. The era is past when heaven was scaled by placing mountain upon mountain. There are no Titans now-a-days; and the Olympus that could be so scaled exists no longer. Our modern monuments of grandeur are built with single bricks.

The cementation of one such brick into the edifice of Irish prosperity has taken place within the last few days. The ceremony was performed with proper masonic honours, and the brick will, we hope, not only secure an abiding place for itself, but provide a pattern whereupon other "bricks" may be fashioned and elevated, until they constitute a noticeable addition to the progressing structure.

Quitting metaphor, we wish to record in simple terms our cordial congratulations upon the promising manner in which the Irish Amelioration Society have commenced active work. This association has undertaken to perform the most difficult and most useful task to which human enterprise can be devoted—make something out of nothing; or we should perhaps rather say, a combination of two nothings. Ingredients which were useless or even noxious apart, have been rendered highly valuable by being brought together. These unexpected relationships are among the most curious and important discoveries of modern science. Between the foul refuse of the

London sewers and the sour sodden masses, which, covering to the depth of some thirty feet many thousand acres of land, constituted what was known as the "bog of Allen," who could fancy that any connexion existed, worth the trouble of investigating? Yet under the skilful researches of the originators of our above-mentioned society, the connexion is shown to be at once simple and profitable: and by properly working it out, they promise to secure a large share of the two chief blessings of life, health to the town and wealth to the country, by one and the same operation.

The peculiar "property of matter" whereon the society build their anticipations of success, is the power so highly exercised by charcoal under its various forms of neutralising the effluvia and arresting the process of decay in organised substances. These effluvia are in crowded cities the chief communicants, if not the sole causes of infection, and their existence renders the disposition and the removal of the accumulating refuse from the huge metropolis alike difficult and disagreeable. For many generations the river has seemed the appropriate outlet whereby all objectionable deposit might be transmitted to the purifying ocean; and to that service it has been hitherto devoted in the most reckless manner. But London has now grown too big to be bid to wash in the Thames, and be clean. The cleansing waters were not copious enough for the foul work they had to do. They could but dilute without obliterating the deleterious exhalations and corrupting elements. The evil required some more active treatment than the mild affusion of *aqua pura*.

A class of chemical re-agents was thus called into existence, under the denomination of "deodorizers." Many prescriptions were easily prepared which possessed the faculty of fixing the volatile gases, and thus rendering the resulting compound innocuous. But, generally speaking, these included different metallic salts of a highly poisonous character; and though sanitary and moral considerations might, nevertheless, have incited completion of the progress, it was one which would necessarily advance more rapidly and satisfactorily if that great incentive to enterprise in the eyes of an Englishman—a handsome dividend—could be promised as an additional result. It became, therefore, of importance to find some deodorizing ingredient, not destructive to vegetable life, so that the baleful effluvia might be annihilated without destroying the value of the resulting mass as a manure.

Successive experiments speedily demonstrated the fact that charcoal possessed these combined qualities in the highest degree, which being diligently followed up by Mr. Jasper Rogers, led to the conclusion that of all charcoal, that made from peat was the cheapest and best. Here was the idea from whence the Irish Amelioration Society has arisen, full armed for action and conquest. In Ireland it is calculated that three million acres of

bog, of the most dreary and hopeless aspect, offer their illimitable supplies of peat, for which, when converted into charcoal, London alone, if properly managed, will furnish a demand extending to more than two million tons annually. In England the lowest cost of wood-charcoal is £4 a ton, while the society expects to secure a good profit out of 30s. With such an extensive demand, and so wide a margin in price, it will be strange, indeed, if a new and profitable trade be not soon established between the English metropolis and the hitherto deemed "waste" lands of the sister isle.

The visitors invited to "the bog of Allen" for the inauguration fête on Thursday week saw but the small beginnings of the society's operations. Three wooden erections, so light as to find foundation upon the spongy bog, together with a few plank butts, sufficed to contain the requisite apparatus, and to shelter the four hundred "men, women, and boys" who are already employed in cutting the peat. The water-logged cakes are first dried as far as the atmosphere will dry them, and afterwards charred in iron retorts, separated according to

qualities, and packed in bags for the English market. Almost the sole cost of producing the article is the labour employed; and the returns, after deducting the shareholders' dividends, which are limited by their charter of incorporation to six per cent., will be distributed in the shape of wages among the Irish people. In recounting the progress of his enterprise in an after-luncheon speech to the guests, Mr. Rogers stated that the royal charter "almost imposed" upon the association to establish two hundred stations throughout Ireland for the same purpose and on the same pattern as that which they saw around them at Derry-mullen. Assuming that the general average would be on the same scale, there would be direct and lucrative employment thus provided for no less than 80,000 individuals, to say nothing of the multitudes who would find a livelihood in the various duties attending the transport and sale of the commodity. It is long since we met with an undertaking that promised to make so welcome a gap in the sad array of Irish pauperism.—Atlas.

REPORT OF A VISIT TO THE FARM OF MR. RIGDEN, SUSSEX.

At a meeting of the East of Berwickshire Farmers' Club, David Milne, Esq., of Milnegraden, read a report of a visit to this farm, as follows:—

I beg to submit to the club some information which I have obtained whilst resident in England, of cases of successful farming; and which, being materially different in the methods adopted from anything known to me in Berwickshire, it occurred to me that it might furnish materials for a report, and a more useful discussion to follow it.

THE FARM OF HOVE, NEAR BRIGHTON.—740 ACRES.

The general farming in Sussex is by no means superior. The undrained state of the land—the clumsy construction of the ploughs—the great teams of oxen, dragging not only ordinary implements but carts—and, above all, the want of leases, clearly betoken a very backward state of agricultural knowledge on the part both of landlords and tenants.

Mr. Rigden, the tenant of Hove, has a lease—its duration being fourteen years. He has horses to draw his implements and carts. The average produce of his farm, before he entered, was 28 bushels per acre of wheat: which is two bushels more than the average of the county. It has yielded, under his management, usually 36 bushels.

The rotation, previously to his occupation, was six shift; by which 2-6ths of the land was in grass, 1-6th in green crop, and the other 3-6ths in corn. The rotation which he follows is a four shift; by which he has half of his land every year under green crops, and the other half in corn, chiefly wheat.

The farm is situated about a mile to the west of Brighton, and slopes to the sea; but he derives no advantage from sea-weed, as there is little or none thrown up on this part of the coast. The general surface of the

farm faces the S.W., and is exposed to the full blast of the gales which blow from that quarter.

Mr. Rigden has been in the occupation of his farm for nine years. The following table, made up from the accounts of the year ending Martinmas, 1849, shows the chief items of expenditure and receipt:—

YEARLY EXPENDITURE.

Rent	£1,300
Taxes	150
Tradesmen's bills	353
Sundries (including insurance, losses, &c.) ..	100
Wages to labourers and servants	1,690
Stable-yard dung, purchased .. £593	686
Night-soil 50	
Guano, bone-dust, &c. 43	
Brewery grains, for feeding cows	100
Seed account	150
	£4,529

YEARLY RECEIPTS

Wheat sold*	..
Barley do.	..
Stock and wool sold	..
Milk from 21 cows	..
Straw sold	..
Potatoes on 50 acres, sold on ground ..	..
Clover, tares, and rye, sold as green meat ..	..
Hay and oats sold	..
Pigs sold	..

Of course the foregoing table does not represent the full amount of produce actually raised; besides what is sold, much is consumed on the farm. The value of the total produce, on an average of the last two or three years, Mr. Rigden estimates at £9 per acre.

I have said that one-half of the farm is in corn, and

* Mr. Rigden gave to me the sums obtained under the different heads here mentioned, on the condition that they were not to be printed and published; though he did not object to their being stated verbally to a meeting of the club.

the other half in green crops. The kinds of crops, and the quantity of each raised, are shown in the following table.

Some of the land is made to bear three crops in two years; thus: tares, rape, and rye are sown in the autumn, which are cut or fed off in April. The ground is thereafter ploughed up, to be planted with potatoes, turnips, or mangold in May; and in autumn wheat is sown.

Acres.	Average produce per acre.	Average price for in 1848-9.
350 in corn.	250 in wheat. 40 in barley. 60 in oats. 20 in mangold wurzel.	26 bushels. 40 do. 60 to 80 do. 30 tons.
110 in root crops.	12 in white turnips. 12 in swedes. 6 in carrots. 50 in potatoes. 10 in cabbages. 50 in clover. 50 in ryegrass and mixed.	10 do. 150 to 300 bushels. 2 tons.
240 in clover, &c.	20 in sainfoin. 30 in hay. 10 in lucerne. 50 in tares followed by rape. 30 in peas.	£12 to £15 per acre.
40 in permanent pasture.		
740		

Mr. Rigden observes, "My oats and barley generally follow wheat. I am aware this system is open to objection; but as a general rule on the Southdowns, we cannot grow good barley after turnips. Our custom is to plough the wheat stubble as soon as possible after harvest, and to plough again when we sow barley about the end of March or beginning of April. The land in my occupation is better calculated for wheat than barley."

In regard to the soil on the farm, it is, generally speaking, light, and so porous that, though there are no drains in it, the water seldom stands after the heaviest rains. Mr. Rigden thus speaks of his soil:—"In some places, a large ironstone lies about a foot below the surface, which often breaks the ploughs. On other parts, the subsoil is a brick earth. This is very excellent land. Where the subsoil is gravel it is naturally poor, which is the case with a great part of the farm, and would produce very little except by high cultivation."

I may here add, that the farm is very much exposed to the wind. There is not a tree upon it; nor are there any fences, except on each side of the railway, which passes through part of the farm. There was one hedge on the farm when Mr. Rigden entered, and that one he removed.

The stock kept on the farm was as follows:—

- 350 Southdown ewes,
- 20 Southdown rams,
- 150 Teggs (or female lambs) a year old,
- 21 Milk cows,
- 12 Heifers of different ages,
- 28 Farm horses,
- Pigs and poultry (a few).

The amount of capital expended by Mr. Rigden on his farm is about £12,000, in explanation of which I may observe, that

1. He had to pay a considerable sum at his entry for what are called "Mendments," and "half mendments." It is the custom in Sussex, when a way-going tenant leaves manure on the farm, that the value of it should be paid in full, when it has not been applied to the land; and even after it has so been applied, some value is put on it, if, in the opinion of arbiters, its efficacy has not been entirely exhausted. In like manner a way-going tenant is paid for ploughings, the benefit of which is to be reaped by the next tenant. Mr. Rigden stated to me, that he considered, that by force of this custom, about £3,000 would be awarded to him, were he at present to remove from his farm.

2. Soon after his entry, he began to subsoil his land to the depth of eighteen or twenty inches. This was effected by an ordinary plough, followed by a subsoil plough with four horses. Almost the whole farm was subsoiled.

3. Another expensive operation was liming or chalking.

4. Mr. Rigden spared no pains or expense in forming a superior flock of Southdowns. He has "given as much as seventy guineas for the use of a ram." This, he said, will explain the high price which I obtain for my ewes. The common price last year in this county was from 25s. to 30s. The prices which I realized were as follows:—

	£	s.	d.
150 Wether lambs, sold at an average 20s.	150	0	0
55 Ewe ditto, at 21s.	57	15	0
20 Ram ditto, at 70s.	70	0	0
10 Older rams, at £15 150	150	0	0
120 Ewes, at £3..... 360	360	0	0
355	£787	15	0

5. It will be seen, from the nature of the carts and implements employed on the farm (which will afterwards be described), that, under that head also, a very large outlay occurred.

I proceed now with some details of management, beginning first with the stock.

I.—STOCK ON THE FARM.

1. In regard to his *sheep*, I quote Mr. Rigden's words—"My ewes begin to lamb the last week in February; shortly before which they are brought into the straw yards, and put under sheds. There they are fed with hay; but, for a few hours in the day, they are driven out to white turnips (the green round kind), of which I have always a field at hand. I avoid giving them Swedish turnips. After they lamb, the ewes are put upon rye and winter barley, as the earliest green food which can be got for them. They also get mangolds and cabbage, and some picking on the grass land, till the rape and clover are ready for them. I consider it important to give a variety of food, as when fed on any kind, and particularly turnips, the ewes are apt to have their milk tainted, and then the lambs do not thrive. The ewes are confined on the rape and clover fields by moveable fences, called 'wattles;' and a new piece is

given to them daily. But openings are made in the wattles to allow the lambs to get through, which I consider very important. The tares last till the middle of June, when the lambs are weaned. The lambs' tails are all cut off, and this is done when they are nine days old.

"The best food for the lambs just weaned is the rowen or aftermath of the sanfoin, with the aftermath of a meadow or a clover. They are sold in the months of July, August, or September; generally for being fatted in the grazing districts or on an artificial food. It is unusual for farmers in the Southdowns to fat the stock they breed. My ewes are sold about the end of September, generally by auction on the farm, as also the rams and ram-lambs.

"I sell my ewes when they are four years old, and I replace them with an equal number of stock lambs. After the lambs and draft ewes are sold off, the rams are put to the ewes.

"From Michaelmas to Christmas the sheep are fed on rape and on the stubbles, for I have no downs on my farm. The land is much enriched by their being folded on it. When the cold weather sets in they are put into straw-yards at night, and fed upon hay. I have found that, to give breeding ewes rape or turnips during frosty weather, abortion is very likely to happen.

"The number of lambs which I have yearly is about 400, of which about 250 are sold.

"The quantity of wool which I get is on an average about 4 lbs., and it sells for 1s. per lb."

2. The cows are kept in a byre, and are milked twice a day. They yield on an average daily $2\frac{1}{2}$ gallons of milk, which is sold for 10d. per gallon.

The cows are fed entirely in the house; but they are turned out daily for two hours, in winter into the straw-yard, in summer into a grass field; and whilst there out, the litter for their beds is cleaned and changed. They are also every day curried and brushed.

The food given to them consists of a variety of things, whereby as (Mr. Rigden remarked), any peculiar flavour to the milk is avoided. When I saw them last winter, they were getting daily mangolds, turnips, carrots, cabbages, and brewery grains.

About six of the cows are fatted and sold off every year, and their places supplied by heifers bred on the farm.

The remaining calves are generally sold; but when the market for milk is dull, which occasionally is the case, it is applied to bring up and fatten calves.

3. The few pigs which Mr. Rigden keeps are fed with barley and peas.

He allows some people in Brighton to occupy an old quarry on the farm, where from 70 to 80 pigs are kept. Mr. Rigden supplies the straw for litter, on condition of getting the dung produced.

4. The farm horses are fed on hay, Belgian carrots, oats, wheat-chaff, and pea-haulm. They consume all the oats grown on the farm. The quantity of oats and carrots given is two bushels of each to a horse weekly. The horses go out to their work in the morning—six a.m. in summer, and seven a.m. in winter. They con-

tinue at work till half-past three p.m., having an hour's rest in the field in forenoon.

Care is taken to cover the horses with sheets when they stand in the field in cold weather, for a few minutes; and for that purpose the men always take sheets out with them, folded up and buckled to the harness.

Of the 28 horses employed in the farm, seven do nothing else but travel to and from Brighton, delivering produce and bringing out manure.

Mr. Rigden generally breeds two or three yearly; besides which he occasionally buys one or two cart colts, rising three years old, and for which he pays from £30 to £35.

II.—CROPS AND MODE OF CULTURE.

In explaining how the crops are raised, I will notice the following points separately:—

1. Implements of husbandry.
2. Servants and labourers, with their wages.
3. Seed, the quantity sown and how prepared.
4. Manure applied, kind and quantity.
5. Preparation of the land.
6. Reaping of the crops.
7. General remarks.

(1.) IMPLEMENTS. Mr. Rigden has—

Of ploughs 12. They are of wood, and cost about £4 10s. each. They consist of a beam, which rises from the share at an angle of 45° , and with two wheels in front. The mould board consists of a flat piece of wood, which is shifted at each turn of the plough, so that it ploughs the same furrow slice backwards and forwards.

There are two sizes of ploughs, one for ploughing the stubble, and the other of a lighter character. The former requires three or four horses to draw it, with a man and boy.

Harrows.—Besides the ordinary kind, there is a Finlayson's harrow, which cost £15. It is drawn by four horses, and goes over eight acres in a day's work of nine hours.

Drill Machines.—There are two on the farm, each of which costs about £36. Drawn by two horses.

Presser.—Drawn by four horses, and, when new, costs £16. This implement has six iron rings, which turn round as it is drawn over the soil, weighing altogether about a ton. The rings are smooth, and there is a prong or fork on the top of each, to throw off any soil or weeds which may adhere to the rings. This presser is indispensable in order to stiffen the land for wheat. Mr. Rigden says of it "that it is particularly useful after clover or rye grass hays, in order to make the land as close and firm as possible, and thereby destroy the wireworm. It is drawn over the land after it has been ploughed, and the rings form parallel furrows in the soil, which are excellent seed beds. A light harrow follows, which covers up the seed." Mr. Rigden adds, "This presser is not intended for the same purpose as Cross-kill's roller, though it much resembles it. The latter is used in heavy land, to pulverize it; the former is useful in solidifying a seed bed in light land."

Another implement to which Mr. R. attaches im-

portance is a *roller*, consisting of three iron cylinders, drawn by six horses, and which costs £70. He uses it to press down the young wheat, and indeed all his crops which succeed lea, as otherwise the wireworm would be most destructive. He can go over twenty acres in a day with this machine.

A *Haying* machine, cost £14, and consisting of a revolving rake for winning hay.

A *Horse-rake* for stubble, which cost £8.

About a dozen of long *waggon*s on four wheels. Several of these are constructed so as to carry night soil and liquid manure, and cost about £40 each.

In regard to these, Mr. R. says "that they are of a clumsy description, and I have no doubt that they ought to be exchanged for something of a lighter nature."

A thrashing machine, driven by four horses, and a winnowing machine, driven by hand. The barley and oats are thrashed by flail, at the rate of 2s. per qr. for barley, and 1s. 6d. to 1s. 8d. for oats.

2. SERVANTS AND LABOURERS.—There is a bailiff or farm-steward employed, who receives 18s. per week, with a free house, a pig, and perquisites amounting to £5 yearly.

The ploughmen's wages amount to from 10s. to 12s. weekly; the hinds' are 12s., carters' 13s., and boys' from ten to twelve years of age from 2s. 6d. to 5s. weekly.

Mr. R. says, "The great majority of my labourers live in Brighton, as I have not accommodation for all on the farm. In spring and autumn I have often fifty men at work on the farm, besides women and boys. Last summer the wages of a day labourer were about 12s. a week. They are now (February) from 9s. to 10s. a week. They are rather higher in this district than in other parts of Sussex, on account of proximity to Brighton, where, on account of the extensive building going on, there is a great demand for labourers."

Mr. R. contracts with a smith to keep in repair all his implements and shoe the horses. Hitherto he has received for this £60 yearly; but Mr. R. told him lately that he must work to him at free-trade prices, and offered him £50, which he agreed to take.

Much of the farm-work is done by special contract, as turnip-hoeing, thrashing, mowing, reaping, thatching, &c. The rate paid for turnip-hoeing is 4s. per acre for the first hoeing, and 3s. per acre for the second. Thrashing costs: for barley 1s. 8d. to 2s., oats 1s. 4d. to 1s. 6d. per qr. His wheat is thrashed by a machine, with his own horses and servants. Reaping costs: for wheat from 9s. to 12s. per acre. Mowing costs: for clover from 2s. to 3s. 6d., for oats and barley 2s. 6d. per acre. Thatching costs: for hay-stacks 9d., and for wheat-ricks, 10d. per square yard.

The following letter relates to the description of Mr. Rigden's system of farming, given above:—

MR. RIGDEN ON "HIGH FARMING."

TO THE EDITOR OF THE SUSSEX EXPRESS.

SIR,—Your paper of the fifth of October contained an ex-

tract from the report of David Milne, Esq., of a visit to my farm, read at a meeting of the Berwickshire Farmers' Club.

As a portion of that report is calculated to produce very erroneous impressions, I should feel obliged by your giving insertion to the following explanation:—

When I gave the information to Mr. Milne, I had not the slightest idea that it would be published; but the club having expressed a strong desire that the report should be printed, I gave a very reluctant consent, but objected to the publication of the figures I had furnished to Mr. Milne.

There are two great mistakes in Mr. Milne's report, to which I would more particularly advert; he states that in the year 1848-9 I had 250 acres of wheat, and that the produce was 36 bushels per acre. He also states that 50 acres of potatoes averaged from £12 to £15 per acre. With reference to the wheat crop of 1848, it was in this county far below an average, and my crop in that year was at least a quarter per acre less than Mr. Milne's statement; the potatoes in that year were also greatly affected by disease, so much so that nearly one-half of my potato crop did not pay for my digging up; and the extent of the injury done to the crop will be understood, when I state that the 50 acres only realized £208.

I feel it to be due to Mr. Milne to state that I informed him that an *average* crop of wheat on my farm was 36 bushels per acre, and that an *average* crop of potatoes would fetch from £12 to £15 per acre; he *assumed* that I had an average crop in 1848-9, and hence the mistake.

The constant advice now given to the tenant farmer is to invest more capital in the land, and to farm higher. I think I may venture to say that few persons have put more capital into the soil than myself; but when I looked forward to reap the fruits of my labour, a law was passed which destroyed all my expectations.

WILLIAM RIGDEN.

Hove, Oct. 15, 1850.

SAFFRON WALDEN AGRICULTURAL SOCIETY.—PRIZES FOR SWEDISH TURNIPS.—The prize for the best field of turnips is always a matter of great interest, both from its handsome amount, and the strict secrecy with which the award of the judges is preserved up to the time of its announcement. The conditions of the competition were read by the Secretary as under:—"Lord Braybrooke offers a prize, value £20, to be laid out in the purchase of one or more improved agricultural implements, at the option of the winner (and the bill for which will be paid by the treasurer), to the practical farmer, being a member of this society, who shall show, in the autumn of 1850, the best piece of Swedish turnips, consisting of not less than seven acres, upon an occupation of from 50 to 200 acres; and of not less than 15 acres, if the occupation exceeds 200 acres. The turnips to be grown on a farm within twenty miles of Saffron Walden." A sealed paper was then handed to the chairman, who, on opening it, announced (amidst loud cheers) the name of Mr. John Clayden, of Littlebury. The prize of £3 10s. for the 2nd best was awarded to Mr. Wm. Bennett, of Cambridge. The Secretary said he was authorized by Lord Braybrooke to state that he would offer the same prize again next year; but it was his wish that parties should signify their intention of competing for it earlier in the season than had hitherto been the practice. (Much cheering.)

AGRICULTURE AND THE RURAL POPULATION ABROAD.

[FROM THE SPECIAL CORRESPONDENT OF THE MORNING CHRONICLE.]

FRANCE.—No. I.

THE VALLEY OF THE SEINE AND ROUEN.

If I rightly understand the mission with which I have been entrusted, my business here, so far as it can be accomplished in a necessarily rapid tour, is to sketch the condition, in all its attainable phases, of the French peasantry; personally to examine into the common phenomena of their daily work, daily fare, and ordinary modes of life; to see them and talk to them in their fields, their vineyards, and their cottages; to describe, generally and popularly rather than technically, the state of their agriculture, and the various handicrafts more or less connected with it; and to blend with this picture of the physical condition and apparent prospects of the rural population of our great neighbour and rival, such notices of their moral, intellectual, and social state, as I may be able from time to time to glean from personal and familiar intercourse with the people. Wide as is the field which I have here indicated, it does not yet include the whole of the task which has been set before me. My business is primarily with the rural life of France, but I shall not thereby be restricted from occasionally drawing a passing picture of striking phases of city industrial existence. I shall now and then be found by the side of the loom in the dark town alley, as well as by the side of the plough in the field, and the wine-press in the vineyard. I shall minutely inspect and describe the cottage dwelling of the peasant proprietor, with its garniture of rude agricultural implements, and its clustered masses of humble farm buildings; and now and then I shall vary the scene, when passing through great cities celebrated as seats of manufacturing industry, by sketching, as truly and as forcibly as I may, the conditions and the circumstances under which the town labourer lives, the *ateliers* in which he pursues his toil, and the household accommodation to which he returns when each day's toil is finished.

"The continental level"—"Sink to the continental level"—the phrases are favourite ones at any agricultural gathering. How many of the orators who use them fully comprehend their precise import, fully understand what—physically and socially—is the level of which they talk, is another question. It is, however, if I mistake not, to help in throwing some light upon the actual height of this level—to help at getting at the real truth of the agricultural and industrial prowess of the "untaxed foreigner"—that I and my colleagues have been despatched upon our several missions. So far, then, as diligent inquiry and personal inspection will go, I shall do my best to enlighten the English mind upon the actual condition and capabilities of the rivals with which our farmers have to contend, and in competition with whom they have to breed cattle and raise corn. A great portion of France

being indeed a vine rather than a wheat-growing country, my inquiries will be, so far, of a nature bearing only indirectly upon our home operations. Still, however, the general question of "continental level" relates to the vine-dresser of Languedoc, as well as the wheat-grower of La Beauce. Each is alike subjected to the operation of certain national influences and certain social modes, and it may be safely asserted that the condition of one-half of a vast rural population could never be permanently raised decidedly above, or permanently sunk decidedly beneath the ordinary level of the other. I shall thus consider the physical and social condition of the dusky labourer who hoes the grapes of the Gironde, and even that of his still swarthier neighbour to the south, who cultivates the olive and the fig-tree, to be by no means without their bearing upon, or their interest in the eyes of, our northern population, now preparing, it is to be hoped, to maintain a stout battle in the productive lists of the world.

The effects of the minute subdivision of landed property in France will of course form everywhere a main subject of inquiry. On a topic, however, involving considerations of such vast importance, and social enigmas which the world has so long striven unsuccessfully to solve, I feel it impossible to be too cautious. I shall therefore in this matter deliberately feel my way—contenting myself for the present with indicating the obvious and unmistakeable effects of the minute proprietary system. Furthermore, I shall be careful, on all occasions, to note the class and nature of agricultural tools and implements in use, and to inspect and describe the style of farm-buildings and out-houses. To these particulars will be added some brief accounts of the various breeds of cattle commonly met with in France, and the different purposes of the farm to which they are applied. As far as practicable, I shall also strive to ascertain the ordinary rates of rent and wages—subjects on which it is not always easy to obtain a fair and accurate impression; but my main business will be the portrayal of those visible signs and indices of social life which form unerring tokens of social condition, and of the existing stage of social progress.

I should still, however, I conceive, be omitting a feature in the design before me, did I neglect to say that I consider it a part of that design that I should by no means rigidly restrain myself to dry details of agricultural production, and the more hard and unyielding features of ordinary physical life. On the contrary, I shall strive to brighten and enliven my canvas by many a little sketch of character and incident of travel. I shall by no means, in describing a district, sink the landscape, and talk only

of stiff clay soils and gravelly bottoms. I shall not deem it incompatible with the dignity of my undertaking to pause over an oddity of costume, or perhaps an apparently insignificant trait of manners. My business is to convey a true impression of the life of the lower classes of France, and I conceive that I shall not be neglecting it by sketching the fore-castle of a river-steamer, or a third-class railway carriage, by endeavouring to realize to the minds of the English reader a way-side lottery held on a fête-day of a parish, or by presenting him with a true picture of the Sunday evening revels at a village guinguette. Will it be denied that if the wayfarer in a foreign country, looking about him with his own eyes, creeping aside from the great dusty thoroughfares along which flows the ceaseless tide of eager travellers, intent upon little but their journey's comfort and their journey's end—will it be denied that if such an inquirer thus turns his steps into the thousand little rural nooks and quiet unheard-of corners of the land—now chatting in the village auberge, now penetrating into the village school—watching, so far as he unobtrusively can, the household life and household modes of the people—standing beside the farmer in his barn or the shepherd by the lone cross way—now picking up a hint from a wandering *garde champêtre*, anon watching the blue-bloused ploughman turning up his shallow furrows; not a bit, indeed, above receiving a scrap of information from the sun-dried old crone who holds solitary watch over a skinny cow: will it, I repeat, be denied that hints, pregnant with meaning and full of suggestiveness, may thus be picked up—that a thousand tiny rays of light may be thus thrown upon the social life and industrial capabilities of our neighbours—that much real and curious information may be thus gleaned—picked up in waifs and strays, by a man who travels through a country intent upon seeing its people rather than its lions?

Thus much premised, I proceed to sketch one or two of the rural features observed, and of the incidents met with, during the last few days which I have spent in desultory wanderings along the valley of the Seine and Upper Normandy. My communications must be to a certain extent rambling—my earlier ones particularly so. It is not easy at once to systematize a plan of inquiry such as the one which I have sketched; but I prefer giving the details which are yet vivid in my mind, and describing what I have actually seen, to producing at some more distant period a picture possibly more coldly correct in some of its proportions, but wanting the charm of such vigorous drawing and freshness of colouring as I can impart to it.

My first talk with a representative of the agricultural mind of France took place in a third-class carriage on the Rouen Railway. It was on a Thursday—the weekly epoch of the great cattle market at Poissy—a market principally supplied with animals from Normandy and the districts adjoining the valley of the Seine, and in its turn supplying the people of Paris with their seven days' consumption of beef, mutton, and veal. Several thousand oxen here change hands hebdomadally, with a corresponding supply of the creatures destined to make cotelettes and fricandeaux. My travelling companions were

the usual blouses of the French peasantry, but were clearly jolly graziers, well to do in the world; and carrying on extensive transactions with the butchers of Paris. Two of them at least bore goodly leathern purses, within which was ever and anon heard a cheery chink of a far richer import than that to be produced by the jingling together of humble sous. Presently we fell to talking of things rural and pastoral in France. There was perhaps nothing very particular in the conversation, but the decided grumbling tone of my cattle-breeding acquaintances struck me as being so remarkably similar to that which I had left on the other side of the Channel, that I cannot altogether omit the incident. Prices were low, ruinously low, they said. A man could not get a living out of his trade. Look at the rate at which beasts had sold only that day, and let me say whether it was possible. I asked them whether the free admission of cattle into England had not benefitted the French graziers? Not a bit of it. Sending *bestiaux* to England, would never pay. The passage and expenses by Havre were fifty francs a head, and the thing, as a general trade at least, was out of the question. The recent changes in English legislation had not then produced any effect upon the French agricultural interest. They had done it no good and no harm. So far as that went, things were just as they used to be. I asked about the crop just being secured. They replied that it was an excellent one; and this assertion, I may remark, is everywhere confirmed. But the prices of *blé*, like those of cattle, were too low for the farmer to thrive. There was another thing too; when lands were let the rents were too high. The great owners of land wanted great revenues to spend at Paris and abroad; and, altogether, times were hard—very hard—upon every one who made his bread by labour upon the soil. Now, I give this conversation for no more than it is worth. It was the mere casual chat of a railway carriage; but it seems to me, to some extent, to indicate a prevailing tone of mind upon the subject, and the more so as there could be no intention of mystifying or misleading in a conversation having no apparent object than the simple one of beguiling the tedium of a railway journey. I may add that the French graziers appear to make but little use of the rail in transporting their stock to market. On both banks of the Seine I have, within the last few days, passed great herds of oxen slowly trudging their weary way to Poissy. Their cattle principally travel, at least in the warmer season, at night, resting at all events in the heat of the afternoon. Sign boards proffering field accommodation for these victims of the consuming population of Paris are common in every scattered hamlet along the road.

There are few tourists to whom the aspect of the valley of the Seine is not familiar. Most of them will remember the flat plateaus of light corn and meadow land, sprinkled here and there with clumps of hard wood, and eternally traversed by those gaunt and dreary trees, the poplars. They will not have forgotten the occasional dingles of fresh green copse, or the solemn shady avenues leading to quaint high-gabled chateaux. They will easily recall the clumps of gaily-whitened houses in which dwell the industrious cultivators of the infinitesimally divided

patches of land, which spread away, covered each with its proper crop, almost like the chequers of a greenish tartan, and each tiny estate divided from the neighbouring territory only by a furrow drawn an inch or two deeper than ordinary. Then they will bethink themselves of the white chalk cliffs rising from the winding river—of the swarming plots of vineyards wooing the sun upon the steep slopes of every hill—the vines themselves looking in the distance something like stunted hops, and the sombre green of their hue broken every yard or two by a blue speck, showing where the hard-working proprietor is laboriously hoeing the roots of the luxuriant plants—working as he has been since before sunrise, and as he will be until after sunset. In the midst of this vine and corn country lies a quiet rural French town. It boasts the usual garrison of poplar trees. It has its half-built cathedral, rising gravely and greyly over its white, steep, narrow streets. By the banks of the river, which divides it into two portions, legions of washer-women gabble over their splashy work, and sternly-bearded men fish all day for miserable gudgeons. This is the town of Mantes, and, taking up my quarters here, I sallied forth to watch and note the style of rural matters in its vicinity.

One of the very first features which strikes one in the country in France is the semi-savage custom of placing almost every cow under the guardianship of an old woman or a child—generally, however, the former. There is something dreary enough in the picture of the burnt-up and browned old lady, squatted from morning to night upon the scanty herbage, jerking the cow with one end of a knotted cord, and seemingly as dull, unimpassionable, and mindless as her quadruped companion. The cow, one would think, might be easily tethered, as frequently falls to its lot with us, on the edge of a tempting clover field, and so much human labour would be thus saved. I put this view of the matter to two or three peasants, but the only answer I could get was, that the custom had always been so; while the apparently most thinking individual whom I addressed expressed his own private opinion that the old women were fit for nothing else. A bunch of straw stuck erect in a hole in a field is the signal that no cattle whatever are to be pastured there.

You look in vain in the corn lands of France for the neatly constructed and ingeniously adapted mechanical contrivances for drilling, clod-crushing, sowing, and so forth, more or less in use over every acre of grain-growing land in England. In the course of two days' rambling about Mantes, I saw nothing further advanced than very small, and some of them very rude, wheeled ploughs, and light harrows with wooden teeth. The forks with which the people were turning the black trefoil hay in the fields were merely cloven sticks, and like implements were in use in the barns and barn-yards. The soil about Mantes is very light and sandy, and a horse of the pot-bellied breed, so common in France, assisted by a very well kept donkey, seems amply sufficient to do all the pulling required at the plough. The truth is, however, that for all the depth to which the ploughshare penetrates, the donkey, as it struck me, could have very nearly performed the business himself. To all intents and

purpos-es, it was stretching rather than ploughing; and as I watched the progress of the shallow furrows, I thought of Mr. Mechi's declaration, that England was not ploughed one-third deep enough, and wondered what the agriculturist of Tiptree-hall would have said to the sun-burnt honest-faced French peasant contentedly whistling between his short plough stilt. The ploughs in question consist mainly of a stout block of wood forming the body, and to which the small and inefficient share is attached; wheels are invariably added, to no good purpose, as any one acquainted with the working and principle of the instrument knows; while the shortness of the stilts yield only a slight and insufficient leverage power to the conductor. In barns and farm-yards the primitive flail was, as might be expected, in use, instead of the threshing mill. A still ruder process was going on in one *grange* into which I adventured. The operator took the corn-sheaves by handfuls and beat their heads across a wooden tressel. The process was slow, but it was, as I understood, preferred to that of the flail, inasmuch as the straw was less broken and spoiled by the operation.

Except in particular districts of France, it is well known that the small proprietors principally reside in clustered villages, or in the suburbs of neighbouring towns, from whence they come every day to their labours in the fields. Such a village, exclusively occupied by the neighbouring landowners—how different is the French from the English ordinary acceptance of the word!—I explored near Mantes. It was a jumble of rudely built houses, mostly thatched, and each surrounded by its appertaining farm buildings—in other words, by perhaps a tumble-down looking shed, built of unhewn beams and clay, within which a roughly put together cart, and half-a-dozen spades, scythes, and so forth, would be stowed, from under the shelter of which would be heard proceeding the quick heavy beat of the flail, and conducting through its wide open portals to a yard thickly strewn with the refuse of the stable and the byre—masses of trampled fodder and dung, distilling pools of liquid manure, which oozed into and stunk from the lower nooks and corners. The house, barn, shed, stables, and so forth, are thus all crowded together, and connected round the yard in the centre—spaces being, however, sometimes left between each establishment, and devoted mainly to the growing of grapes for the table, luxuriant clusters of the fruit twirling round the copings of the white clay walls, and hanging temptingly over the rudely-paved lane beneath. The village consisted of a jumble of such erections, half dwelling-places, half farm-buildings, intersected by devious lanes, and by the uneven and irregularly running walls upon which the grapes were trained. There was only a single shop, a *débit du tabac*, and no public-house. Why should there be, in fact? Every man, as a general rule, lived upon his own ground, and had his own wine in his own cellar. The aspect of things was certainly rude and uncultivated; neatness, order, a sense of cleanliness, and the ability to make a better disposition of the space at the command of the inhabitants, were all wanting; but of extreme poverty and squalor there were not the remotest indications. These farmers might

cultivate their small patches in the most unskilful and slovenly fashion, but it was easy to see that they cultivated them so as to make a fair living out of the soil.

At one end of this village, close to the church, a quaint and very ancient building, stood the school. I entered, and was most courteously received by the master, an intelligent-looking young man, dressed in a blouse, and having that meek, studious, and thoughtful expression sometimes to be seen, and very beautiful when seen, among the younger members of the priesthood. The pupils over whom he presided were about thirty in number, composed in nearly equal proportions of boys and girls. The master's desk stood at the centre of one of the walls of the apartment; and opposite to it, extended transversely across the room, was a screen, separating the sexes. This arrangement, I was informed, is required in all French National Schools. The general appearance of the place was very like that of an English school of a similar class. The same battered and ink-stained desks ran along the floor, and the same piles of slates and copybooks lay in corners. On the walls were suspended huge arithmetical and grammatical placards, giving tables of weights and measures, and of the genders as determined by the terminations of nouns; while on the boy's side was an ordinary print of the Saviour, accompanied, on that of the girls, by a similar representation of the Virgin. Nothing could be more satisfactory in a sanitary point of view than the appearance of the children. Almost without exception they were as chubby, bright-eyed, and active-looking urchins as could be imagined, twisting themselves, as little boys and girls will do when in the presence of a stranger, into all manner of odd contortions and writhing attitudes, and staring out of their black eyes as hard as they could. They had just finished their writing lessons when I entered. The master had chalked *Ne perdez pas le temps* upon a black board, and the scholars had reproduced it in half-text in their copy-books. These were willingly shown to me, and exhibited specimens of promise which one could hardly believe would fade away into the scurvy scratchiness which too often characterises French penmanship. The scale of fees charged was one franc per month for the younger, and half as much again for the elder children. They were taught reading, writing, arithmetic, and geography, with the history of France. Many of the pupils attended only half the day, being occupied during the other half in the fields; but there were very few parents indeed in the locality who did not make it a point that their children should receive at least the rudiments of a decent education. Like all other seminaries of the class, the school was frequently visited and minutely examined by a Government inspector.

Along the steep slopes of the hills rising from the river on either side of Mantes, stretch, for miles and miles, a chequered expanse of small vineyards. Like the little properties appropriated to the growth of corn, they are only separated by furrows, while here and there a patch of potatoes or haricots intervenes with its less poetic growth, to vary the dark-green monotony of the vines. Although the cultivation of these grapes appears to form a very con-

siderable portion of the resources of the peasantry, the fame of the produce is happily only local. The good folks of the country say that their vintage produces a *bon petit vin*. They must certainly make oceans of it, and, during the time of the *vendange*, the peasants from the neighbouring corn-growing and grazing districts pour in to help in the operation of culling, stamping, and pressing; but as for the qualities of the liquid finally produced, I can only say, from the specimens submitted to me, that bad red ink is a feeble term of comparison by which to shadow out the virtues of the elixir. The vineyards were, however, most diligently cultivated. The roots of the plants were hoed with the most careful precision; and as I wandered from patch to patch, I could not but admire the patient and neat-handed industry of the swarthy men, who never seemed to straighten themselves from their monotonous toil. With several of these I had some talk touching the wages of their labour, the duration of their daily tasks, and their ordinary species of food. Many of them had to walk two and three miles to their work. They carried their breakfasts, generally consisting of bread with a morsel of cheese or onion and a mouthful of wine, with them in a little basket. At noon their wives or children brought them their soup, accompanied in most cases with some mess of stewed vegetables, the nucleus being a small piece of pork or coarse meat. After dinner, in pleasant weather, they frequently took an hour's nap in the field; while, in the case of heavy and continuous rain, they retreated to rude thatched out-houses scattered here and among the vineyards, and which served also as depôts for their tools. As to wages, I had, as usual upon that point, much disparity of testimony. By the labourers themselves I was told that a man even in the best part of the season could not make above 30 sous or one franc and a-half a day. People in a better class of life, whom I questioned upon the subject, were quite ready to double the amount, and to assign corresponding halves and quarters as the usual wages of women and children. The truth I take to be, that from 40 to 45 sous may be the outside of the daily gain of a stout and skilful farm-labourer.

The tools which I had an opportunity of seeing in use among the vines were almost entirely pronged hoes, used to loosen the earth about the roots of the plant. To one man I observed that the handles, which were not much more than two feet in length, were far too short, and that he might work with greater ease and effect if he were not obliged to stoop so constantly. The poor fellow—an old man with grisly grey moustachios standing out from his embrowned face—straightened himself by an apparent effort, and at once admitted the correctness of the suggestion. Were the handle of the implement of sufficient length, he could work so and so, holding the hoe as though it had been a rake. Then why was it that the hoes had not longer handles? "*Ah, dites donc, est que je sais, moi*"—the handles had been of the same length when he was a boy, and no doubt they would continue of the same length after he was dead and buried.

In the opening of this communication I expressed my intention of occasionally leaving the fields for the city, and roughly sketching to what extent I

could the condition of life of the workmen employed in any great staple of manufacture which I might observe. Since writing the lines in question I have taken advantage of a few hours passed in Rouen to visit one of the cotton mills there, which I was assured might be taken as a fair specimen of a French *filature* of the ordinary class. There are, as everybody knows, in the capital of Normandy, spinning and weaving establishments, some of the best having been erected by Englishmen, which, for perfection of machinery and organization, would bear comparison with the most "crack" mills of Staley-bridge and Ashton. I preferred, however, seeing a thoroughly native establishment, and I was accordingly introduced into a *filature* spinning coarse cotton, and weaving some small portion of the thread into calico. So far as the machinery went, the whole affair was a tolerably exact copy of a Lancashire mill.

I could see little difference in the general construction of the carding, the card-roving, the spinning, and the weaving apparatus, between the French establishments and the scores of factories which I visited last winter in the north of England. So far, however, as the style of the building, the finish of the mechanism, and the state of the atmosphere and the temperature were concerned, the establishment put me in mind of a very old-fashioned fourth-rate mill in Manchester, or an ordinary coarse spinning-factory in Oldham. There were no ventilating arrangements other than such as could be made by opening the windows. The air in the carding-room was bad, loaded with film and dust, and there was a general greasy oiliness about the whole establishment, the floors being peculiarly unctuous, which a liberal use of soap and water would have advantageously corrected. The temperature of the engine-room—in England one of the most comfortable places about a well-regulated mill—was quite unbearable. The hours of actual work in the establishment were twelve—the limit fixed by the law. The engine was set in motion at half after five, and ran, with two stoppages of an hour and a half, until seven. Some of the Rouen mills do not commence operations until seven a.m. The people are then supposed to have breakfasted, and the work goes on until eight p.m., with an hour's stoppage, about one or two o'clock, for dinner. The law regulating the extent of labour in factories has only passed since the revolution. Prior to that period I was told that when trade was brisk fourteen and sixteen hours work per day were not uncommonly exacted. The wages of a spinner were stated to me as ranging from two to three and a half francs a day; women earned from a franc to a franc and a half, and children, according to their ages, a half or a quarter of that rate.

I took some pains to explore the *Basse Cité* of Rouen, the quarter in which the operatives chiefly live. It is the oldest part of the town, the majority of its houses having been in existence when Jeanne d'Arc was burnt in the market-place. A pile of buildings more magnificent in one respect, more melancholy in another, can hardly be imagined. You wander through a labyrinth of lanes, or rather courts, but as it were amid the foundations of the most strange and wildly fantastic piles of mediæval

houses. Look up, and you catch narrow and broken glimpses of the sky, amid the wavering lines of towering antique gables, and strange mouldering partisans and ancient projecting galleries, and irregular masses of carved and pinnaced timber, cut into quaint sculpture, and tokens and devices. Mark how the grey, dank, mouldering dwellings lean hither and thither; elbowing each other, as it were, and thrusting each other out of the line first intended by the architect; sometimes each story projects beyond that beneath, so that a cart may pass the doorways, and two opposite neighbours may shake hands at their respective windows beneath the eaves. Here and there you look down side-alleys, tunnels of places for darkness—mere splits, as it were, in the mouldy architecture; and ever and anon comes a fœtid cavern of an entrance into the bowels of a crushed-together mass of hoary dwellings—dim lights flickering in the distance at the turnings of airless passages, beacons to the adventurers who by that way penetrate to the nooks of garrets or the holes of cellars which are their homes. And this great labyrinth of roughly-paved lanes, and blind alleys and closes—this rotten old mass of picturesque magnificence—swarms with inhabitants as does an ant-hill. They are buzzing along the streets, rushing in and out of door-ways, shouting and screaming and chattering from roof and window—diving into black public-houses, lounging round the low door-posts of fusty shaving shops—men and boys in the eternal blue blouse—old women and young girls slatternly and drab-like—and scores and hundreds of working dyers, with their naked arms red or yellow or pink, according to the hue which they are imparting to the cloth. Nor are these the only features of the scene. You hear the rush of water, and, turning the corner, come upon a black fœtid stream, rank with oils and slush from dye-works, rushing turbidly along the foundations of the houses, which rise sheer out of the inky water. Here and there are slimy sluices, and water wheels flinging up a sickly froth as they go plunging round, turning the machinery of small factories inside the rickety houses. Just above the level of the stream, doors open from its bank of ancient masonry and carpenters' work, and planks run from side to side, on which dyers crouch, laving their cloth in the black foul water. Ugly as is the stream, however, it is the life-blood of the *Basse Cité*. It affords the only drainage the people have. In the streets and lanes not so favoured a stagnant kennel oozes through the rough paving-stones. All sorts of refuse and garbage descend from door and window into the street, and fester on and cumber the very ground. As may be well imagined, the pestiferous smells are beyond description. A continued variety of odours and exhalations meet you at every turning, and blow up from every dark passage. The whole place is one vast rickety mass of picturesque rottenness and artistic decay. A painter would swear by the *Basse Cité* as the very sublimation of materials for his craft. A stern sanitary reformer would doom every picturesque, historic, mediæval ruin of them all, to the besom of utter destruction; for amid all the real beauty of the scene the elements of social misery are awfully rife. Typhus too often goes hand in hand with the

architecturally picturesque. No man or woman inhabiting such dog-holes—dark mouldering nooks of cellars hollowed out amid rotten wood—can be expected to do aught than suit their furniture and their habits of life to the dreary labyrinth in which they dwell. In the rooms into which I peeped the *ménage* appeared to be terribly squalid, dirty, and comfortless—miserable broken furniture was huddled without distinction of purpose in corners, or strewn on the floor. Most rooms were tenanted each by a household, and I was informed that very few families indeed possessed more than a single chamber. There are bad enough and filthy enough courts and alleys in the worst parts of Manchester; but anything more hopelessly foul—more utterly unsuited, indeed, for the dwellings of human beings—than is the mass of the *Basse Cité* of Rouen, it is quite impossible to conceive. Surely it would pay some enterprising speculator to build a city of workmen's houses in some suburb of the town, to provide the people with dwellings where the common decencies of life, and the common necessities of health, should be provided for. As to the old houses, they are quite unimprovable; and however much one would regret it in an artistic point of view, it is really impossible to see men and women so lodged, without feeling that these piles of mouldy plaster and timber have long ago done their duty, and that they should now, in obedience to the instincts of a civilised state of society, be swept utterly from the earth.

In my investigation last season in Manchester I took some pains to inquire into the factory system, as operating upon the infant children of the women who worked at the card-frame and the loom. Upon making some inquiries as to whether there was any French substitute for Godfrey's cordial or Daffy's elixir, I was assured that the custom of drugging children was quite unknown, and that if a mother had no time to attend to her offspring in the day she sent them to the *creche*. This *creche*, or *asile d'enfants*, I therefore made haste to visit. It is a public institution, supported by the city of Rouen, and in some respects like our infant schools. The main point, however, is the taking care, rather than the instruction, of the children. In a spacious and

airy school-room-looking place, furnished with painted alphabets and so forth, were assembled about two hundred children. The boys and girls were ranged opposite to each other, under the charge of two intelligent-looking young women. The contrast between the pallid faces and stunted forms of the poor little creatures, as compared with the rude health and strength of the urchins in the country school, was painfully obvious; some of them seemed in a half-torpid state, leaning their heads on their companions' shoulders. Two or three were crying, and there was a general painful look of inanition and wearisomeness, occasioned very probably by a low state of health, visible all over the tiny ranks. Both the mistresses appeared extremely kind and painstaking persons. At their direction the children sung a sort of doggerel hymn, very much in the style of similar compositions made use of in our infant schools; one of the superintendents keeping time by snapping down the lid of a small empty box which she held in her hand, and by rattling which she gave a variety of signals, which the children responded to by performing a corresponding number of marching evolutions about the room. Every morning, I was told, the mothers brought their children to the *creche*, some of them, in the summer time, as early as half-past five o'clock, and every evening, when work was over, they fetched them away. A large adjoining room is appropriated as a sort of *salle à manger*. Each child comes provided with a basket, containing its provisions for the day. These are placed in long rows upon the floor, and at meal times the children are marched in regular procession, each file up to its respective row of baskets. I inspected the provisions with some curiosity. Most of the fare was hard enough—brown bread, with a scanty allowance of butter, being the staple commodity. Here and there, however, was a morsel of meat or sausage, and about as frequently the eye caught a bottle, containing a small portion of cider or milk. Round the school-room were proper play-grounds, and altogether the institution appeared to me, considering the inevitable wants of a factory population, to be that often-quoted movement—"a step in the right direction."

(To be continued.)

ON THE CONSTRUCTION OF COMPOST-HEAPS.

There are few agricultural processes about which greater confusion of ideas takes place than the proper construction of compost-heaps. That in themselves they are indicative of a pains-taking and careful farmer is readily conceded: that it is desirable to collect and scrape together, and mix the various refuse-matter of a farm, and allow them to make themselves into manure, is also easily admitted. But the indiscriminate mixing of the different matters which fancy or caprice may jumble together, is as remote from scientific farming as

anything can possibly be. We are aware it is hardly possible to make any mixture which will do no good. To grass land, especially, almost any of the thousand and one combinations, in their thousand and one proportions and modifications, will be of more or less service; and hence it is supposed that the making of the compost in itself was a source of great economy.

There is not a greater error in the making of these indiscriminate mixtures, than in the almost universal adoption of *lime*, as one of the *menstruums*

for the transmutation of the qualities of the heap. Soil is collected, carted into a heap, mixed with well-fermented dung, and a few tons of quicklime are added to the mass! This is a compost. A more liberal man will mix a few bones perhaps, and if they are dissolved he thinks the mixture a model of perfection. But he does not know what he is doing. This combination may be good or bad, according to its compliance with the laws of chemical affinity; or it may violate all the rules which science lays down for preserving and preparing the elements of nutrition for the crops to which it is about to be applied, or it is destroying or dissipating them with hopeless indifference.

Lime may do good in some composts. It is evidently useful where the main bulk of the compost is of a peaty character. With a substratum of this kind of material, lime may be of great service; but if this be absent we know of no reason for applying lime—the quantity will be of little comparative use, unless the compost itself bears a small proportion to the lime employed, and unless it is applied at a liberal rate per acre; and if the soil be in want of lime, we think it preferable to apply it directly to the land, rather than run the risk of the havoc it may play in the compost, by changes none for the better, of the other ingredients of which it may be composed. It will tend, for instance, to nullify the action of the bones; to dissipate the ammonia of the manure; to lock up the phosphoric acid, if superphosphate of lime is used in the heap. Hence we ask why should so dangerous a material be used, when there is no necessity whatever for its mechanical or chemical aid in the heap?

The compost-heap we have always held to be a sort of conservatory—a reservoir, so to speak, for the unemployed manurial elements of the farm, where they may be preserved and elaborated and concentrated for the use of the crop at the most favourable period; and this we imagine is the object of a compost, rather than the mere mixing of a mass of heterogeneous materials, without regard to their affinity for, or combinations with each other. If lime is to be used, it is clearly indicated in cases where peat bog is the substratum, and this mixture should be made long before the compost is brought into use. If it is then thought desirable to add any more concentrated fertilizer, it may be done with impunity and advantage. But as composts are ordinarily constituted, consisting of the clearings of ponds, the scrapings of roads, the sides of hedge-banks, or decaying vegetable matter in general, we are quite of opinion that the

lime is not only in most cases useless, but often injurious.

Take the following as a sample of one of the best general composts. Collect together as much refuse matter as can be conveniently brought up with the least expense of cartage, having an eye not only to the collection at the compost-heap, but to its distribution afterwards where it may be required. The neighbourhood of the farm-buildings is often the most favourable situation for both, all things considered. To this accumulation should be added—not lime, as we said, but what now appears to be the very perfection of a detaining body for the manure—we mean *clay*, as finely divided as circumstances will admit of; and if the mass is once or twice saturated with manure drainings, it will be found a most valuable manure in itself. But if it is desirable to procure some extraneous assistance, there is not a better addition for the corn crop than the ammoniacal liquor of gas-works, which near a town may be had for a trifle, and is by far the cheapest mode of obtaining the ammonia so necessary for wheat growing. To still further add to the general utility of the heap, we would advise the adoption of the following plan:—

Procure a large earthenware jar, capable of holding 8 or 10 gallons; or, if the establishment is large, a cask of 20 to 25 gallons will be preferable. Into this collect all the refuse bones of the house and the farm, and when it is full, pour half the quantity of sulphuric acid necessary to fill the cask. This will in a few weeks reduce the largest and most stubborn bones to the consistency of thick cream; and when the acid is so far taken up that it ceases to produce the proper impression on the bones, it is fit for application. Now this mixture, if poured upon the compost-heap, will at once convert it into a fertilizing mass of the greatest value and power; and if care of this kind were exercised, much of the great sums expended in fertilizers might be saved, the same regard being paid to the keeping up the fertility of the farm.

We may venture to name one other compost which, on clay lands, will be particularly valuable: it is a dry compost, consisting of road scrapings, and the refuse of old buildings, lime, dust, &c. If any old buildings are being pulled down, the old lime, brick rubbish, &c., are of the greatest value, and should in no case be wasted, as is too often the case, in repairing roads. The lime will be found in combination with almost every acid, and the whole mass of rubbish permeated by the most valuable fertilizing materials. — Gardeners' and Farmers' Journal.

RUTLAND PLOUGHING MEETING.

It is 23 years since Mr. R. W. Baker, of Cottesmore, first turned his attention to the advantage of encouraging good ploughing in Rutland by means of annual competition; at that time there were very few good ploughmen; but as meeting followed meeting, the spirit of honourable rivalry increased, until at length the smallest county in England stood before the agricultural world as the most celebrated for its arable cultivation. Rutland ploughing having reached this point of pre-eminence, and Mr. Baker having arrived at the 20th year of his management, three years ago he relinquished his position, in the hope that what he had so well established might be continued by others; no one, however, seemed willing to take the responsibility of the meetings, and the annual competition ceased until the present year, when Mr. Baker again resolved to take the field, and the result has been the largest and most important series of ploughing matches ever known in this or any other country. The locality selected for the trial of industrial skill was Great Casterton and Ingthorpe (two miles from Stamford), on the farms of Mr. Savile and Mr. Edw. Roberts; and at eight o'clock on Tuesday the 8th inst., no less than 138 ploughs were simultaneously set to work. The scene was a most imposing one; and as the operations progressed, admiration was on all sides expressed at the extreme nicety with which the numerous competitors guided their shares, turning up ridges as straight as a line, and forming furrows of such accurate dimensions that not the least difference of measurement was perceptible. The judges had a most difficult task to perform in selecting the best men, though in the end their decisions gave general satisfaction. The number of visitors to the fields in which the ploughing took place was immense, and the village of Casterton had not presented such a busy aspect for many years. Among the county gentry who attended the operations in the course of the morning were Gilbert John Heathcote, Esq., M.P., and some friends, Geo. Finch, Esq., and his daughter, the Hon. Gerard Jas. Noel, M.P., the Hon. Henry Noel, Stafford O'Brien, Esq., J. A. Ransome, Esq., of Ipswich, &c., &c. The judges were Mr. T. R. Outbush, of Teston, Kent; Mr. Hawkins, of Assingden Hall, Suffolk; Mr. Benj. Painter, of Carlton Curliou, Leicestershire; Mr. Harrison, of Bagworth Park, Leicestershire; Mr. Burbidge, of Wakerley; and Mr. Fowler, of Exton.

The ploughs used were chiefly manufactured by local makers, being Ransome's principle adapted to the soil and system of the county. The quantity to be ploughed by each candidate was half an acre of land, and the conditions were that the work should be done within four hours, the furrows not less than four inches deep, and horses abreast without a driver.

In the first class, for farmers' sons, there were 16 competitors, and the prize (a cup of the value of £10 given by the Earl of Gainsborough) was awarded to Chas. Tucker, of Exton. Three of the competitors were highly commended, viz., John Adcock, of Stretton, Wm. Laxton, of Cottesmore, and Philip Ashton, of Greetham. In presenting the prize to young Tucker (after the dinner), Mr. Baker said it afforded him much pleasure to hand over to him such a handsome testimony to his skill, which he could have attained only by persevering industry and good conduct. He regretted that the health of the Earl of Gainsborough, who was the youth's father's landlord, would not admit of his attendance to present the cup in person, for nothing would have given the noble lord greater pleasure

than to find a tenant's son so honourably distinguishing himself. Young Tucker's father was not only a tenant of long standing, but his grandfather had lived under Lord Gainsborough's ancestors, and he believed prior generations also. The health of the successful candidate was given, and he returned thanks in spirited terms, and was loudly applauded by the whole company.

In the second class, open to all England, there were 49 entries, and the prizes (seven in number) were awarded as follows:—£5 to Wm. Morley, of Ryhall Lodge; £4 to Wm. Scott, with Mrs. Johnson, of Braunston, by Belvoir; £3 to Josiah Hibbett, with Mr. Hammond, of Barnsdale Lodge; £2 to Thos. Manton, with Mr. Burgess, of Ridlington Park; £1 to Rd. Downs, of Ryhall; 10s. to Geo. Gregg, with Mr. Fabling, of Burley-on-the-Hill; and 5s. to Geo. Pilkington, with Mr. William Pilkington, of Little Bytham. It is worthy of remark that the winner of the first prize in this class has been a winner nearly a dozen times at different meetings; Scott had previously won a second prize in the All England class, and altogether has received £50 in prizes; and Hibbett has won in cups and money £37.

In the third class, for ploughmen of Rutland—who had never won a premium at any ploughing meeting, there were 33 entries, and the prizes were awarded as follows:—£5 to John Smith, with Mrs. King, of North Luffenham; £4 to Henry Dawson, with Mr. Thos. Fryer, of Hambleton; £3 to Thos. Preston, with Mrs. Knoulton, of Braunston; £2 to Jos. Webb, with Messrs. Wortley, of Ridlington; £1 to John Robinson, with Mr. Bellaers, of Greetham; 10s. to Henry Beavor, with Mr. Turner, of Empingham; and 5s. to Fras. Hales, with Mr. Clough, of Tinwell. The judges commended the class generally. In addition to the above premiums, Mr. John Bird, of Casterton, gave a pair of Rutland seed-harrows to Mrs. King, as the owner of the first prize plough.

In class 4, for ploughboys under 21 years of age, there were 19 competitors; the following received the prizes:—£4 to John Webb, with Mr. Bassett Rowell, of Ridlington; £3 to John Smith, with Mr. Savile, of Ingthorpe; £2 to Thos. Martin, with Mr. R. Stafford, of Exton; £1 to Robt. Cross, with Mr. Hammond, of Barnsdale Lodge; 10s. to Thos. Cole, with Mr. Savile; and 5s. to William Dunmore, with Messrs. Wortley, of Ridlington. The master of the first prizeman in this class (Mr. Rowell) stated, in reply to Mr. Baker, that he himself had won several prizes. In his first and second trials he was unsuccessful, in the third he won a cup, in the fourth he won a cup, and in the fifth he also won a cup. Mr. Baker dwelt upon this person's progress in life as a most interesting feature of the utility of the ploughing meetings. Twice beaten, still he persevered, and afterwards became eminently successful; and when he received one of the cups, the late Sir Gerard Noel said to him, "Take this as the best testimonial to your character; it will show that you are a man fit to become a farmer." He did become a farmer: he took a farm out of cultivation, but he ploughed it well and drained it, and he took a prize for draining; and now, not only was he himself a good specimen of what a man might become by steady conduct and perseverance, but he was master of a youth who had taken a first prize in his class. Mr. Rowell's health was then drunk with applause.

In class 8, for ploughboys under 17 years of age, there were

16 competitors. The successful six were rewarded as under:—£4 to Robt. Tyler, with Mr. Laxton, of Greetham; £3 to Thos. Chamberlain, with Mr. W. D. Humphrey, of Empingham; £2 to Frs. Hare, with Mr. Godfrey, of Greetham; £1 to John Springthorpe, with Mrs. Springthorpe, of Whitwell; 10s. to Wm. Chappell, with Mr. Savile, of Ingthorpe; and 5s. to John Glover, with Mr. Berridge, of Barrow.

In the afternoon a dinner took place at the Exeter Arms Inn, and Mr. Wilders (the landlord) catered in a most liberal spirit for the large party who assembled: 120 sat down, and all expressed their satisfaction with the profusion of viands and dessert, and the style and quality of everything supplied. The chair was taken by R. W. Baker, Esq., the founder of the meetings, who was supported by the judges and some of the principal agriculturists of the county. Mr. Savile presided at a second table, and was faced by Mr. Mosely, of London. A large number of Stamford tradesmen were present.

After proposing the usual loyal toasts, Mr. BAKER addressed the company on the object of the meeting, and paid a high compliment to those noblemen and gentlemen who supplied the funds for the prizes. Alluding to the cup given by the Earl of Gainsborough, he said it had been the means of inciting many farmers' sons to persevering industry, the rivalry it had caused for its possession having led to competition which showed the exercise of both judgment and hard work at the plough. The competition on the present occasion had been greater than at any former meeting; the work generally had been well done, and half of it in a very superior manner. With such results, he thought it must be a matter of great gratification to practical agriculturists that they had around them owners of land who were always ready with their purses to carry out any work which tended to the advantage of good cultivation and the profitable investment of capital. Lord Gainsborough had not only given the cup, but he had contributed to the other prizes which it had been their pleasure to distribute to deserving men. Unfortunately his lordship's health was so delicate as to prevent him from taking an active part in the meetings, though the company would remember that a few years ago, when he was better able to bear the fatigues of public life, he had readily come forward to encourage by his presence, as well as support by his contributions, these practically useful meetings. Mr. Baker then proposed the health of the noble Earl, and afterwards united in a general toast the other subscribers to the premium funds, viz., the Marquis of Exeter, Viscount Campden, Sir Gilbert Heathcote, Bart., G. J. Heathcote, Esq., M.P., the Hon. Captain Noel, M.P., George Finch, Esq., Geo. Fludyer, Esq., Sir John Trollope, Bart., M.P., S. R. Fyde, Esq., the Hon. and Rev. Leland Noel, &c., &c. Mr. Baker added that the Marquis of Exeter had sent a donation of 20 guineas, and that with this timely pecuniary assistance arrangements had been made to give 2s. 6d. to each unsuccessful candidate.—Both the toasts were drunk with three times three.

Mr. HAMMOND proposed "The plough-makers of England," and coupled with it the name of Mr. Allan Ransome, of Ipswich.

Mr. RANSOME said it was to him a source of great pleasure, though not unattended with difficulty, to be able to join the company on the present occasion; for, when he looked back through the long vista of years during which he had occasionally been associated with his kind friend Mr. Baker, and with many of those now present whose heads had grown grey since he had known them—and when he found that the places of some of his early acquaintances had been supplied by younger men whom he had not before met—it was gratifying to find that the object of efforts of more than 20 years' continuance had been fully and successfully realized (cheers). He remem-

bered the time when Rutland was behind the other Midland Counties in ploughing, and when he introduced ploughs which were the types of those now in use; and he congratulated the county on its efforts to carry to perfection this necessary employment. He heartily recognised as brother-workers those makers who had taken the Ransome plough as their model; and, far from looking upon them as competitors, he hailed with satisfaction the display of their ingenuity, and felt great pleasure in meeting them. He had no desire to lower the value of the improvements which had been made in some of the ploughs; but, as an implement-maker, he thought it right to warn them of this fact, and to acknowledge an error into which he had himself possibly fallen, that by a too high breeding as it were, by attempting to make the very best article for the species of competition they had that day witnessed, it did not necessarily follow that the plough best adapted for that purpose was the best description of plough for general purposes. (Hear.) It was important to look to that which would tend most to promote the pounds-shillings-and-pence value of cultivation, and not be led away by the applause which attended success on occasions like the present. Reverting to the principal object of the day, Mr. Ransome said it was pleasant to be able to congratulate the company on the increasing prosperity which attended their efforts in Rutland to promote the cause of good ploughing. He had for many years attended ploughing meetings, though for the last few seasons he had from necessity held himself excused; but, like a good hunter, at the sound of the horn, he could not refuse to visit his friends in Rutland, upon receiving an intimation from Mr. Baker that their meetings were about to be revived. He knew of no instance on record where such a large number of ploughs had started, and so many had done such good work, as at Casterton. He had seen work that morning which he had never seen excelled, if equalled; and he questioned whether he should ever again see it equalled. Looking at the large number of competitors and the limited number of farmers in the county, he was convinced that Rutland had accomplished what no other county could do. Mr. Ransome concluded by offering £5 towards the funds for rewarding unsuccessful competitors at the next meeting: he remarked that he admired the plan of not allowing any man who had come forward in the honourable spirit of emulation to entirely lose the value of a day's work (cheers).

Mr. SAVILE said it was with feelings of great pleasure he witnessed such a large assemblage of his brother farmers on that occasion. It was not to be supposed, however, because they were then met to enjoy conviviality after the business of the day, that they had returned to prosperous times; for it was unfortunately too true that they were still in the midst of suffering; but notwithstanding they had had to submit to the ridicule of a party, the injustice of the legislature, the mockery of the leading journals, and the desertion of their friends, they were anxious to lose no opportunity of effecting improvements and establishing superiority of cultivation (cheers). He believed that those who were connected with agriculture, and those who had been attracted to the operations of the day from mere curiosity, must have been equally gratified with what they had seen. The experiment of reviving the ploughing meetings had proved highly successful, and he thought there could not be a doubt that the result would be beneficial. Mr. Savile then adverted to the services rendered by Mr. Baker in bringing the Rutland ploughing meetings to the eminence to which they had attained, and remarked that when that gentleman resigned his charge three years ago, it was not because others were unwilling to continue them that they had for a time fallen to the ground, but because no one felt competent to manage them as Mr. Baker had done. Great labour and a perfect system

were necessary, as well as great ability; hence that which the Chairman undertook, others shrunk from. Mr. Savile concluded by proposing the health of Mr. Baker, which was enthusiastically drunk.

Mr. BAKER, in returning thanks, admitted there was much labour connected with the office he had held for so many years, but he was compensated for all his anxiety by a knowledge of the fact that he had been instrumental in elevating the agriculture of the county of Rutland in the department of ploughing, and leading it on to something like perfection. During the cessation of the meetings, ploughing had, he was sorry to say, retrograded instead of progressing; but he entertained a confident hope that henceforth they should go forward. He should have been gratified to have seen amongst them many persons from the neighbourhood who from their rank and property might have rendered effectual aid by their personal attendance: it was true some had been to the scenes of the operations; but if, instead of looking round, saying, with a kick of the heels, and a prance of the horse, "I wish you good morning," and riding away, they had mixed more in the business part of the matter, they would have been doing good to themselves as well as to those whom the meetings were more immediately designed to benefit. "In the present condition of things," said Mr. Baker, "we, the agriculturists, are determined to use every exertion in our power to maintain a respectable footing, not only in upholding county against county, but country against country: and with reference to those persons to whom I have slightly alluded, I do hope that the day is not far distant when they will see as clearly as we do, that as ploughing has lost caste by temporary neglect, so they will lose their caste by their inattention, unless they step forward and render that assistance which it is the duty of every Englishman who is able to accord to his fellows. I say, then, let them take warning, and use every exertion in their power to aid and assist every branch of agriculture, and hold up that interest which is so dear to Englishmen—the interest arising from the land" (cheers). Mr. Baker next alluded to the arduous duties of the judges, and concluded by proposing the health of those gentlemen.

Mr. CUTBUSH, in acknowledging the toast, highly commended the ploughing generally, and complimented the county upon the perfection attained in it in this respect. He said these were not happy days for farmers; but, notwithstanding their dismal prospects, the agriculturists of Rutland seemed determined to show that they would not be beaten down by the legislature, without first putting a shoulder to the wheel to help themselves. He hoped better times were in store for them, and that they would not be long in coming.

Mr. HAWKINS next acknowledged the toast of "the Judges." He said it had given him unmixed satisfaction to witness the Rutland ploughing: he had heard of it before, and had found it more than equal his expectations. He then offered some advice to farmers' sons, recommending them to acquire a knowledge of agricultural chemistry, botany, &c., as by an acquaintance with those sciences they would be better able to farm with success.

Mr. FOWLER and Mr. PAINTER likewise acknowledged the toast: the latter said he should like to see the ploughs used "with the wings on;" he had that day witnessed many without wings, and he admitted that he himself preferred driving without wings, but if there were thistles and dandelions in the soil, they could not be effectually destroyed without the wings.

Mr. BAKER next proposed the health of Mr. Savile, who had lent his land for the ploughing; and in returning thanks, Mr. Savile said he could speak from experience of the advantages gained to farmers by holding out premiums for good ploughing. To show the necessity of keeping up the spirit of emulation, he mentioned that before the late ploughing meetings ceased, Mr. Bird, of Casterton, made 508 ploughs in three years; but after they ceased, he made only 140 ploughs in one year. He congratulated them on the success of the revival, that day's meeting being the largest of the kind ever seen in England.

Mr. BAKER then mentioned the names of several gentlemen from whom he had received active assistance, including Messrs. Clarke, Burgess, Savile, Sharman, Wortley, Hawley, Clarke, Morris, &c.: their healths were proposed, and the compliment was acknowledged by Mr. Wortley.

In the course of the evening, Mr. G. H. Betts improvised an excellent comic song (a parody of "Betsy Baker"), laudatory of Mr. R. W. Baker, the chairman, whose services in the encouragement of good ploughing were prominently brought forward in every verse. The song kept the company in a roar of laughter for some time, and the entire evening was spent with much conviviality.

In the course of the evening a song was sung, which concluded with the following verse:—

"Britannia rules the waves, they say;
Well, that's a power no greater
Than ploughing as we've done to-day,
For she could rule no straighter.
But now I've done; and ere I close
Let's give the room a shaker,
For this is what I must propose—
Long life to Richard Baker."

THE HANDLEY TESTIMONIAL.

The first stone of this monument at Sleaford, to the memory of the late Henry Handley, Esq., formerly M.P. for the Southern Division of Lincolnshire, has been laid. The memorial, it is understood, will consist of a colossal statue on a pedestal of granite, surmounted by a decorated canopy rising to the height of sixty-five feet. It will stand in the open space immediately on entering the town from the London road. A large concourse of people, friends and admirers of the

late honourable gentleman, were drawn together on the occasion. The attendance, it was stated, would have been more numerous had the committee been able to give public notice of the ceremony. Every shop in the town was closed, regardless of politics, and business was suspended throughout the day—a striking fact, evincing the popularity of the late honourable gentleman in his native place. No party colours were offensively displayed on the occasion, but an effort was seemingly made to blend

the *blue* and the *pink* together, in deference to the very general desire of the town to concur in this mark of respect to their late fellow-townsmen. The huge corner-stone was drawn along the main street upon a low stone carriage, preceded by a band of music, and followed by a procession of respectable tradesmen and inhabitants, and agriculturists of the neighbourhood. William Foster, Esq., an old and valued friend of Mr. Handley, was selected to lay the stone; and that gentleman having handled the silver trowel and masonic instruments with the customary forms, and adjusted the stone to its resting-place, amidst the cheers of the people, afterwards proceeded to address them. We can only give a brief outline of this address, which was marked by much feeling and good sense, and an entire absence of all party spirit:—"It was expected of every one appointed to the honour of laying the first stone of a memorial to a public man, to offer a few observations on the character that had called forth such a demonstration. In discharging that grateful duty, he would be as brief as possible. In the town of Sleaford Mr. Handley had drawn his first breath; many there were present who could bear record of his earliest life—his bold and generous character—those early promises which had been so amply realized in after life. Having paid a tribute to these recollections, Mr. Foster proceeded to advert to his career at Eton, and the University, where he formed the friendships of many distinguished men, eventually destined to occupy a prominent position in the political history of their country. In 1820 Mr. Handley was elected M.P. for Heytesbury. In parliament he particularly espoused the cause of agriculture. At the period of the Reform Bill, when a change was supposed to have taken place in the feeling of the country, public opinion was directed to Culverthorpe for a popular candidate for South Lincolnshire. Hitherto the aristocracy had taken the lead in returning members to parliament. He did not blame the aristocracy for discharging the obligations which they considered to have devolved upon them; but the time had arrived when it was thought the middle classes should take a more active part in the election of their representatives. Mr. Handley had adopted and supported those opinions. Upon those principles he appeared as a candidate for South Lincolnshire. For six weeks Mr. Foster had been by his side canvassing this independent constituency. The result left no doubt on his mind that the election of his friend, as the representative in parliament of his native county, was secure. From North Scarle at one extremity,

to Long Sutton on the other, the feeling was universal; the support which he received was spontaneous, unanimous, and overpowering. Opposed by two gentlemen powerfully supported—by Sir John Trollope and Mr. Heathcote—the former had, nevertheless, thought proper to retire, and yield the ground to his opponent. It is not for me now to express an opinion upon the probable result of that contest had it come to the poll. Mr. Handley's adversaries were gentlemen of equal popularity with himself; indeed, in the present state of the agricultural interest, I do not know that a more fit representative than Sir John Trollope could be found; of this, however, I am satisfied, that had that contest been carried out, whosoever of the three might have been at the bottom, Mr. Handley would undoubtedly have been found at the head of the poll. He was returned the popular member for South Lincolnshire, and in parliament he faithfully discharged his duty to the free and independent electors that had sent him there. Devoting himself to the advancement of agricultural science, and to the obtaining of relief from various imposts that pressed unfairly upon that interest, his unwearied zeal, the honesty of his purpose, and the success which attended his efforts, earned for him the lasting title of the "farmer's friend." The speaker then alluded to Mr. Handley's celebrated letter to Lord Spencer, which had led to the formation of the Royal Agricultural Society, of which noble institution he had the satisfaction to see his friend elected to the distinguished post of president. Then came the period of the general election in 1841, which, in the changes that betide all public men, was adverse to Mr. Handley. He did not know whether it was the apathy of friends, or the advice which he himself had given, that induced Mr. Handley to retire into private life. He did retire. Suffering from severe infirmities which he had long concealed, he found relief in the bosom of his family, surrounded by his children. In that retirement, honoured and beloved, he was destined soon to end his days. He died in peace and tranquillity, and with good will to all mankind. The proverbial kindness of his heart, his virtues in private life, would remain the sacred trust of memory. Long would his name be cherished amongst them. So long as patriotism, honesty, and independence were upheld as the virtues of public men, so long might that monument to Mr. Handley remain, a stimulus to posterity to follow his example, in gaining the affections of their fellow-countrymen—so long might it remain a worthy tribute to one of the best of men.—Lincolnshire Chronicle.

GREAT SALE AT YANWATH HALL.

The first great sale of the Messrs. Parker's stock took place on Thursday, the 26th Sept., in a field adjoining Yanwath Hall; and old English hospitality spread its abundance of good things before the assembled visitors, who mustered in great force from far and near. Amongst the gentlemen present were, T. Fetherstonehaugh, Esq., C. Fetherstonehaugh, Esq., Rev. H. Wyberg, J. Parkin, Esq., W. Parkin, Esq., Professor Skilling, J. Fawcett, Esq., Scaleby Hall; R. Tinkler, Esq., J. Crosby, Esq., Kirkbythore; J. Thornthwaite, Esq., Arkleby; — Nutt, Esq., York; J. Booth, Esq., Killerby; W. C. F. Thompson, Esq., Solway House; E. Bolden, Esq.; J. Benn, Esq., Lowther; J. Atkinson, Esq., Winderwath; James Burratt, Esq., Maiden Hill; J. E. Troutbeck, Esq., Blencow; W. Lawson, Esq., Brayton Hall; Captain James, Lowthian Gill; J. Watkins, Esq., Bodrhydden; J. Elliott, Esq., Lord Grosvenor's steward; — Houghton, Esq., of Houghton; and many others, whose names we did not ascertain, in the crowd. A handsome marquee was erected near the garden, where a large number of influential gentlemen sat down to a sumptuous dinner; James Parkin, Esq., filled the chair, and discharged the duties of his office most admirably. Unfortunately the weather was unpropitious; but it did not prevent the attendance of four or five hundred persons, though it considerably diminished their comfort. Those who wished it found shelter and good cheer in the old hall, where the fire blazed merrily upon the huge hearth. The sale was decidedly a good one. The bidding was brisk, and Mr. Wetherell displayed energy and decision in the stroke of his hammer. The whole of the stock was acknowledged by first-rate judges to be in capital order, and the sale was conducted in the most handsome manner throughout. Upon the whole, we should suppose that the Messrs. Parker had no reason to complain of the prices. The entire were cleared off by the evening, and there was no attempt to buy in; though in one or two instances, no doubt, the proprietors would have given double the price paid. The cows averaged 22 guineas; the highest price was 53 guineas for a young bull (Pathfinder); the next was 51 guineas for Benedict, which price was considered very cheap; Mr. Bolden bought the first, and Mr. Angus, of Bromley, the second. The sheep, which were excellent, averaged between 50s. and 55s. a head. The general price for ewes was about £3 10s.; gimmers about the same. Lambs at about 45s. a piece. The higher-priced tups were £13. Pigs were considered very dear, one or two fetching large prices; the average was about £9 a piece. Calves were rather small and young, and a heavy down-pouring at the time they were put up evidently depressed the sale. In the course of the day the Earl of Lonsdale called to look over the stock. His Lordship was accompanied by Lady Mary Bentinck. At the conclusion of the proceedings, Mr. Watkin pro-

posed "Success to the Messrs. Parker," and a good hearty cheer resounded through the hall. We subjoin an extract from the catalogue, regretting that we cannot give the whole of it:—

Spots, red and white, calved December, 1838, bred by Mr. Jobson, got by Mr. Bates's 2nd Duke of Northumberland, 30 gs.

Playful, light roan, calved 19th May, 1843, got by Eden, 51 gs.—Mr. Saunders.

Lady Arabella, red and white, calved in 1842, got by 2nd Duke of Northumberland, 18 gs.—Mr. Jefferson.

Cora, light roan, calved in 1842, bred by the late Mr. Buxton, got by Gainford the 2nd, 22 gs.—Mr. Cartwright.

Passion, light roan, calved in 1840, bred by Mr. Cragga, got by Mr. Spearman's Newton (sire of Belville), 18 gs.—Mr. Ambler.

Wear, roan, got by Harsley, dam Emma by Childers, 10 gs.

Princess Royal, light roan, calved in 1841, got by 2nd Duke of Northumberland, 22 gs.

Ruth, roan, calved in 1841, got by 4th Duke of Northumberland, dam Portia by Antonio, 21 gs.

Princess 3rd, red, calved 24th August, 1842, got by Eden, dam Princess by Majesty, 42 gs.—Mr. Steel.

Playmate, light roan, calved 10th March, 1845, got by Patron, dam Spots, 35 gs.

Playsome, red and white, calved 5th March, 1846, own sister to lot 11, by Patron, dam Spots, 21 gs.—Mr. Fawcett.

Pearl, white, calved 21st April, 1845, got by Homer, dam Windermere by Emperor, 32 gs.—Mr. Saunders.

Young Sall Gwynne, roan, calved in 1846, bred by Mr. Troutbeck, got by St. Thomas, 10777, dam Sall Gwynne by Prime Minister, 406, 21 gs.—Mr. Cartwright.

Peeress the 3rd, roan, calved 9th June, 1844, got by Sir Thomas Newton, dam Peeress, bred by Mr. Garthorne, 24 gs.—Mr. Parker.

Portrait, red and white, calved 25th March, 1844, got by Patron, 18 gs.

Poverty, roan, calved 27th March, 1845, got by Patron, 17 gs.

Peeress the 4th, roan, calved 9th October, 1847, got by Senator, 8551, dam Peeress, 30 gs.

Pooley the 5th, roan, calved 22nd February, 1848, got by Senator, 20 gs.

Flora, roan, bred by Mr. Gill, got by Monarch the 3rd, 15 gs.

Plenty, red, calved March 1846, got by The Barb, 7085, dam Plenty, by Son of Dashwood, 15 gs.

Primrose, roan, calved 1st May, 1844, got by Homer, dam Windermere, by Emperor, 35 gs.

Villa, red and white, calved in 1843, bred by Strickland, got by Mars, 28 gs.

Patroness, roan, calved 21st February, 1846, got by Patron, 26 gs.

Peggy 3rd, white, calved 22nd October, got by The Baron 22 gs.

Lady Mary, roan, calved in 1847, bred by P. Dixon, Esq., got by Mercury, 25 gs.

Planet, roan, calved 12th Nov., 1846, got by Homer (2134), dam Sunflower, by Serjeant Major, 18 gs.

Peggy the 4th, roan, calved 18th September, 1847, got by The Baron, dam Peggy, by the Colonel, 21 gs.

Patty 2nd, roan, calved 9th November, 1847, got by North Star, 20 gs.

Kate Kearney, red and white, calved 13th January, 1848, got by Leopold, 16 gs.

Pearl 2nd, roan, calved 11th April, 1848, got by Senator (3551), dam Pearl, 45 gs.—Mr. Bolden.

Plaything, light roan, calved 12th May, 1847, got by Sir John, dam Spots, 25 gs.

Pepperpot, white, calved 14th June, 1848, got by Arcanus, dam Wear, 14 gs.

Merle, roan, calved July, 1848, got by Leopold (4216), dam Mavis, by Unicus, 20 gs.

Peony, red and white, calved 18th September, 1847, got by Senator, 18 gs.

Portia, light roan, calved 25th October, 1847, got by Senator, 16 gs.

Princess 6th, roan, calved 14th January, 1848, got by Senator, dam Princess, 22 gs.

Princess of Cambridge, red and white, calved 30th September, 1848, got by the late Mr. Bates's 3rd Duke of Cambridge, 29 gs.

Passion Flower the 7th, red, calved 26th October, 1848, got by the late Mr. Bates's Euclid, 20 gs.

Prudence, roan, calved 9th November, 1848, got by Euclid, dam Poverty, 25 gs.

Princess 7th, dark roan, calved 16th December, 1848, got by Euclid, dam Princess 3rd, 31 gs.

Pearl 3rd, white, calved 15th February, 1849, got by Euclid, dam Pearl, 28 gs.

Princess Royal 2nd, white, calved 18th July, 1849, got by Lord Hardinge, 18 gs.

Princess 8th, roan, calved 30th December, 1849, got by Lord Hardinge, 30 gs.

Psyche, light roan, calved 6th July, 1850, got by Abraham Parker, dam Octavia, 17 gs.—Mr. Ambler.

Princess Royal the 3rd, light roan, calved 11th July, 1850, got by Abraham Parker, dam Princess Royal, 13 gs.—Mr. Thompson.

Pliny, roan, calved 11th May, 1847, got by Homer, dam Red Roan, bred by the late Mr. Buston, by Wharton, 57 gs.

Pathfinder, roan, calved 28th June, 1849, got by Lord Hardinge, son of the late Mr. Bates's 2nd Duke of Oxford, dam Lady Gentle, 53 gs.

SOWS AND SOW PIGS.

The Actress, 2 years and 6 months old, by Lord Radnor's boar, dam Lola Montes, £8 15s.

Premium Sow, 4 years old, got by Young Thormanby (The first prize boar of the Royal English and Highland and Agricultural Societies' shows), dam My Lady by Dreadnought, £11 11s.

Fortune, 1 year old, bred by R. W. Saunders, Esq., by his celebrated prize boar Peregrine Pickle, dam by Mr. Boustead's boar, £12 18s.

Sally the 4th, pigged 30th August, 1849, got by "The Miller," dam Sally 3rd, bred by R. W. Saunders, Esq., by Peregrine Pickle, £6 6s.

Miss Pickle, pigged in May, 1850, bred by Mr. Unthank, got by Peregrine Pickle, £7 10s.

Susannah 1st, pigged 10th November, 1849, got by The Miller, dam premium sow, by Young Thormanby, £9. Mr. Fetherstonhaugh.

Susannah 2nd, pigged 10th November, 1849, own sister to lot 8, £6 15s.

Susannah 4th, pigged 10th November, 1849, own sister to lots 8, 9, and 10, £3 10s.

Celeste, pigged 12th November, 1849, got by Young Kingston, dam The Actress, £6 10s.

Madam Greasy, pigged 12th November, 1849, own sister to lots 12, 13, and 14, £6 10s.

BOARS.

The Actor, pigged 12th November, 1849, got by Young Kingston, dam The Actress, £6.

Prizefighter, pigged 23rd May, 1850, got by Peregrine Pickle, dam premium sow, lot 2, by Young Thormanby, £7.

The Tickler, pigged 26th May, 1850, own brother to lot 19, £5 5s.

With respect to the sheep, there were twenty-three lots of Leicester Ewes, six lots shearling ewes, thirteen lots of ewe lambs, ten lots of rams, which ranged from £3 10s. to £7 5s.; sixteen lots ram lambs, ranging from £1 15s. to £5 10s. There were also three bull calves, and four heifer calves; but of these our reporter sends us no note.

It is quite clear, from what we have stated, that the Messrs. Parker know how to breed and manage stock. —Carlisle Patriot.

LIVERPOOL ANNUAL PROVISION REPORT.

BACON.—We regret that the season now closing has again proved unfavourable, so far as the shippers of bacon are concerned, although by no means so disastrous as the preceding one. The large stock left over from last season for some time moved off slowly, and had thus a depressing effect on the value of new eastern, the price opening at an unusually low figure; notwithstanding which a very poor demand could be induced, and the tendency has been nearly ever since downwards. We attribute this to the very plentiful supply and consequent cheapness of both Irish and English bacon. The cure of the former is estimated to have been nearly as great as during any previous season, while that of the latter has been undoubtedly much larger. The prosperous condition of the working classes in this country enabling them to neglect almost entirely the ordinary and even good descriptions of westerns forced us to

depend very much on Ireland for an outlet for this cure, and we believe that fully more than three-fourths of the imports have been transhipped thence. But a low price alone is compatible with a large consumption there; any attempted advance interfered with the trade materially, and thus low rates ruled throughout. We have only received about two-thirds of last year's quantity, and our stock is now 870 tons less. These facts have produced rather more activity on the part of the buyers lately, and the season closes with an upward tendency in prices, the impression being general that we shall without much difficulty get through our present stocks before we can have any important arrivals of new. Notwithstanding, however, that the first imports of next season may come to a bare market, it must not be supposed that there is any chance of higher rates than the present ones. The considerations above alluded to,

with reference to the consumption in England, will operate during the coming season quite as effectively as they have done in the present; indeed, perhaps more so; for the very low price of all feeding material is likely to stimulate still further the production of the home article. The American importer must, therefore, look to the probable wants of Ireland, which, so far as we can judge by past experience, will be very much regulated by the price at which the supply can be given.

BEEF.—The close of last season found us with an unusually large stock of this article both in importers' and in dealers' hands, so that when the first parcel of new northern arrived there were very few buyers in a position to supply themselves freely, and the quality proving in most cases extremely indifferent, sales progressed unsatisfactorily, excepting in the case of one or two of the choicest parcels. The quality of northern did not improve as the season advanced, nor did the earlier imports of western come up to their former character, the colour generally of the latter being especially objectionable, and the packing no improvement upon former years. From the commencement of the season accounts of a short supply continued to reach us from America, and as the imports during March exhibited a decided falling off, these statements were credited and a speculative feeling induced, the consequence of which was a rise to the extent of 7s. 6d. to 10s. per tierce. This advance, however, had the effect of bringing forward several large parcels, in consequence of which the market soon relapsed into a state of comparative inactivity, and the above-noted improvement was gradually lost. Instead, therefore, of closing, as was anticipated, with a small quantity of old, we have now nearly reached as large a stock in importers' hands as at the close of last season, but we have reason to believe that dealers are not so well supplied. Although we are always disposed to recommend the importation of fine quality of beef in preference to middling or inferior, still we cannot help remarking that during the latter part of this season especially the ordinary descriptions were more sought after, and the better kinds comparatively neglected; and we attribute this change chiefly to a desire on the part of shipowners (in their now altered relations to foreigners) to victual their vessels on apparently more economical terms, forgetting the generally recognized fact that low-priced provisions are always the dearest in the end. As we apprehend very little opposition from the Irish curers, we have every reason to believe that a full average import of American beef will be required by us during the present year; and unless we have a considerable increase in quantity, we think the average price of last year ought to be maintained. It will be observed that the receipts at this port fall short of last year's by about 5,600 tierces, but this is partly counter-balanced by an excess of imports into London by about 4,000 tierces.

CHEESE.—The bulk of the early imports having turned out fine, very good prices were realised, leaving a fair margin of profit to the merchant; but later arrivals proving deficient in quality, were very difficult of sale at any reasonable figure. The consequence was that many importers resolved on holding, and thus we had an accumulation of stock, all of ordinary or inferior character, and which, from deterioration of quality, had eventually to be forced off at very ruinous rates. Indeed, several parcels were returned to New York, in expectation of finding a better market there; in which hope, however, the owners were disappointed. At the end of the season a few lots of very inferior old, and some of the earliest new, came forward, and were sold at prices ranging from 5s. to 30s. per cwt. The recent imports of the latter have, we are glad to say, proved of prime quality, and have brought high figures, say 40s. to 44s., and in one case 46s. per cwt.; rates which, we

believe, are pretty remunerative to the importer. At present we have a good demand for all such cheese; and although perhaps these prices cannot be counted upon for any length of time, still a really fine article will always command a ready market here at rates corresponding to the value of English; whilst we believe ordinary and inferior American will, during the present season, be more unsaleable than ever. From all we can learn we conceive the make of English will not reach the large production of last season. The imports of the past year have been about equal to those of the preceding.

HAMS.—We regret that we cannot report any improvement in the quality of American hams generally; the trade during the whole of the season has consequently been of a very dragging character, and prices have ruled much lower than even last season's. Until some amendment in the cure can be effected, we cannot expect a different result, and would therefore refrain from recommending their importation.

LARD.—The stock of this article about this period in 1849 was 1,100 tons, and the price steady at 35s. 6d. to 36s. 9d. per cwt. In the course of the two succeeding months the arrival of more liberal supplies than had been anticipated caused a decline of fully 2s. 6d. per cwt., which had the effect of inducing some speculative investments. This led to a slight advance, the price in January and February of the present year ultimately reached 34s. 6d. to 35s. Shortly after this period we received a very large amount of imports, which, without any great increase in the consumption, made an almost weekly addition to our stocks, the quantity here at the latter end of May being estimated at upwards of 5,000 tons, or nearly three times greater than had ever before been known. Although a few of the largest importers refrained from offering, still, under the depressing influence above referred to, the value of the article declined until it reached 31s. to 31s. 3d. per cwt. At these figures several large speculative purchases were made, both for English and American account, which had the effect of imparting steadiness to the market, and ultimately prevented any further depression. The low price at which the refiners were now able to offer their goods, aided by the enhanced value of butter, greatly increased the consumption, and holders were thereby enabled eventually to establish an advance, which has been gradually improved upon, until the price has now reached 35s. Although our stock is nearly double that of last year, still, with the present consumption, which we estimate at 6,000 tons per month, and the improbability of receiving, for some time to come, any important addition to our supplies, we do not think it likely that any downward movement will take place until we shall have had imports of new; and the course of prices then will be guided greatly by the supposed quantity which America is likely to send us.

PORK.—The large stock of pork referred to in our last report has had a depressing influence on the trade during the whole year, and prices have been uniformly low throughout. At the beginning of the season, eastern prime mess, which was generally of good quality, found a formidable rival in Irish. The price of the latter was only a few shillings per brl. dearer, and the quality was in all respects superior. In addition a good many small parcels of continental pork found their way here, and the result was, that although the import of eastern was much below that of former years, still sales at first could only be made slowly, and prices were altogether unremunerating. The quantity, however, being moderate, was not long of being cleared off, although the value experienced no improvement. The western turned out, with a few exceptions, as usual, much too fat for ship-store purposes, and disappointment to all parties concerned was the result. In one or two cases a vast improvement was manifest, which was amply re-

warded by the increased price obtained, a few parcels having brought 52s. per brl., or within 1s. to 2s. of the best eastern. For the bulk, however, much lower rates had to be taken, and the stock now left being altogether composed of old as well as new of this description, is more suitable for exportation than for the general wants of the trade. It will be seen that our receipts are not much more than one-half of last year's, our stock thereby being now reduced to a more moderate quantity than for some time previously. The contract for navy pork has just been taken at an average of about 10s. per tierce below the price of last year. We have had very few parcels of meat pork this season, the price obtained for this description in America rendering it an unprofitable article of import. Its value depends entirely on that of bacon.

SHOULDERS.—Our stock of this article at the date of our last circular was about 1,100 hhd., which was not wholly got rid of until well on in the present year, and only then at rates varying from 17s. to 19s. per cwt., according to quality. The arrivals of new being much more limited than had been anticipated, and a brisk demand occurring during the months of May and June, the market was then pretty well cleared, and a slight advance obtained. The improvement has since been well supported, the value of a good article being now 22s. per cwt. The enhanced price has lately brought us a few parcels, and we understand there are some more still on the passage, which, so far as we can judge, are likely to come to a steady market. In future seasons the value of this article will be regulated as heretofore—entirely by that of bacon.

TALLOW.—The moderate price of tallow will have a tendency to prevent the use of any great quantity of lard for chandlery purposes, so that our estimate of future consumption must be based chiefly on the wants of refiners, whose trade, so far as we can judge, is more likely to be an increasing one than the opposite.

THE ISLINGTON CATTLE MARKET.

A very neatly executed "Plan of the Islington Cattle Market, with the Proposed Additions," has just been brought out by Mr. R. B. Grantham, C.E., which enables the eye to form an accurate notion of the mode in which the area is to be laid out, of the relative situations of the live and dead meat markets, the lairs, and of the various other conveniences embraced in the project. The whole is thus described in the letter-press accompanying the lithograph:—

The accompanying plan shows the area of the Islington Market as it stands to be fifteen acres, intended for the live cattle market alone. It will be seen, however, that an addition of thirteen acres will be made to provide for successive enlargements; making in the whole, for the purpose of the market only, twenty-eight acres.

For slaughter-houses and carcass market an area of twelve acres will be devoted to.

For lairage an area of seventeen acres, adjoining the Junction Railway, from which the cattle will be delivered into the lairs, will be provided. This railway commences on the banks of the Thames at Blackwall, and unites the Eastern Counties, the Great Northern, the North Western, and Great Western; and when the contemplated branch of the South Western into the Great Western is completed, will unite the South Western; so that all the cattle brought by these several railways, as well as such as are landed from the steamers at Blackwall, will be conveyed direct to, and delivered in the lairs without travelling

through the streets. Moreover, it should be noticed that an archway underground will be made from the lairs into the market, so that the cattle delivered by railway, at least three-fourths of the whole number exposed for sale, will pass into the market without passing over a single public street. Should it be deemed necessary to secure a further extent of ground for the enlargement of the lairs, or other purposes, a piece of land, containing eighteen acres, on the other side of the railway, and communicating with the lairs, will be secured. Thus, then, without reference to the last-mentioned piece of land, the area to be devoted to the several purposes required will be fifty-seven acres, and including it seventy-five acres, eleven having been pronounced sufficient by the corporation of the city of London.

It will be observed that the Islington Market and its appurtenances are surrounded with spacious roads, uninterfered with by turnpikes, except at one point, where there will be very little traffic.

As much misapprehension and misrepresentation has been afloat in reference to the drainage of the Islington Cattle Market, it is necessary to observe that the area of the market is fifty-one feet above Trinity high-water mark, and eighteen feet above the main sewer in the Southgate-road, which adjoins the property; and by which the extensive buildings now erecting on the De Beauvoir estate, adjoining, are drained.—Morning Chronicle.

NEW CATTLE MARKET IN DUBLIN.

It will be seen by an extract from the *Irish Farmer's Gazette*, subjoined, that almost all the evils complained of as regards the London Smithfield Market are equally felt in reference to the Dublin Smithfield Market:

Want of space, and consequent cruelty to the animals.

Want of room to tie up and handle the animals.

Unmerciful beating to get them out for handling.

Inability of owners to sell their own animals.

Salesmen acting as sellers and bankers.

The necessity of the credit system is refuted by the example of Liverpool and all other large fairs and markets in England, Ireland, and Scotland, where business is done for ready money.

NEW CATTLE MARKET IN DUBLIN.—We take leave to call the attention of our numerous readers to the following paper, which was extensively circulated at the late fair of Balinasloe. Similar papers were circulated at the fair in October, 1849, and influential meetings held in Dublin subsequently, in order to establish new markets, alike beneficial to the seller and buyer. But why the matter has dropped we have yet to learn. We trust the subject will not now be allowed to drop, and that something may be done to effectually check this monstrous evil:—

"A FEW REASONS FOR THE ESTABLISHMENT OF A NEW CATTLE MARKET IN DUBLIN, IN PLACE OF SMITHFIELD.

"The present market is much too small; there are no commodious standings in it as in Liverpool and elsewhere, neither can such be erected, for the space is too confined, and cannot possibly be enlarged; the cattle, beaten and abused by the

drivers in their vain attempts to obtain room, are thereby rendered unfit for export, and also damaged for the butchers.

"A new market could be fitted up, with proper pens and sheds, in which the cattle could be tied up, to be handled by the buyers at their ease, who would not be obliged, as they are at present, to wade up to their knees in mud, in order to get near a beast, or to have it unmercifully driven out with blows before them upon the pavement. The stock might then also be held on without damage for another market, in case the seller was not satisfied with the price offered.

"In the new market, every owner of cattle would have the option of disposing of them himself, without the intervention of an over-paid salesmaster, upon the payment of 3d. per head for cows, and 8d. per score for sheep (these being the prices fixed under the new corporation act).

"It has been stated that no buyers would be forthcoming, unless they were afforded the present system of credit given by the Dublin salesmasters.

"This has not been found to be the case in Liverpool and other large markets, neither does it take place at the fairs of

Ireland, where fat cattle, in large numbers, are invariably bought and sold for ready money. Under a new system in Dublin, English and Scotch jobbers, with money in their pockets, the wealthy butchers, and others obtaining legitimate discounts from the banks, would be sure to attend the market; that they do not do so at present is, because they are fully persuaded they would not meet with fair play in Smithfield, and that they would have no chance whatever in competing with parties who are deep in the books of the salesmasters, and who would be certain to obtain a very decided preference in every bargain.

"It remains, therefore, to be seen, whether in such hard times as the present, the graziers and farmers of Ireland will continue to submit patiently to such abuses; and whether, for the sake of selling in such a badly-constructed and badly-regulated market, they will rest satisfied, in the first place, with paying their salesmasters an unusually high rate of commission, and in the next, with permitting those gentlemen to act in the double capacity of sellers and bill-brokers.—*Irish Farmers' Gazette*.

DEATH OF MR. W. PYLE, OF TAUNTON, AND MR. WM. BLACKER, OF ARMAGH.

It is our painful duty to announce the death of two gentlemen, zealous labourers in the field of agriculture, Mr. W. Pyle, Taunton, and Mr. Wm. Blacker, of Armagh. The former gentleman, a barrister by profession, had for a long time devoted himself to agricultural pursuits, and was the uncompromising friend of the farmer. He also distinguished himself in agricultural literature, having obtained one of the prizes of the Royal Agricultural Society for an essay on the St. John's Day Rye. The latter gentleman is well known to every man who has paid attention to the progress of Agriculture in Ireland during the last twenty years.

We well remember in the course of our early labours on this journal, nearly twenty years since, that we looked forward with great gratification to the annual meeting of tenantry on the Gosford estates, then under the management of Mr. Blacker. The manner in which he brought out the small occupiers to give a statement of their improvements, and the benefits to be derived from them, thereby inspiring confidence and rousing the energies of others of their class, was truly admirable. The sound, practical information contained in the reports of the proceedings of these meetings at that day, when practical speeches at agricultural meetings were so few and far between, was peculiarly interesting. Mr. Blacker's system for small occupiers, was that which is now so much recommended—the growth of green crops and house feeding. He wrote several pamphlets on agricultural subjects, for one of which he obtained a prize given by the Royal Agricultural Improvement Society of Ireland. We have observed from time to time in the Irish papers much credit given to the Lord Lieutenant for carrying out the

plan of sending agricultural instructors to teach the small farmer in different districts of Ireland a better system of farming. We bear willing testimony to the liberal manner in which the noble earl has contributed funds for this purpose, and has assisted in putting the plan in operation. It is, however, but justice to state that the plan itself originated with Mr. Blacker many years ago. Several communications upon the subject from him appeared in the columns of this Journal, and he also wrote a pamphlet on the subject. Although long suffering in health his mind was active to the last, it not being more than two months since he forwarded some printed pamphlets to us, with a long letter in reference to their contents. Ireland has lost in Mr. Blacker not only an honest and industrious labourer in the field of agricultural improvement, but one who sought by every means in his power to ameliorate the condition of the small tenant farmer.

The following paragraph from the *Morning Herald*, having reference to his funeral, will testify the respect in which he was held:—

FUNERAL OF THE LATE WILLIAM BLACKER, ESQ.—Thursday morning, at half-past ten o'clock, the funeral procession of the deceased commenced to move from his residence on the Mall, Armagh, towards Mullabrack churchyard, where is a vault belonging to the family. The respect in which the memory of the deceased was held was amply attested by the attendance at his funeral. The pall-bearers were—the Earl of Gosford, Colonel Blacker, Sir J. M. Stronge, Wm. Paton, Esq., Major Thornton, and E. Tickell, Esq., Q.C. In the first two carriages were the mourners, J. and Thomas Blacker, Esqrs. and Henry Close and Charles Douglas, Esqrs. Amongst the carriages, were those of Mr. Blacker's family, of Colonel Blacker, Lady Molyneux, Mrs. Mauleverer, the Earl of Gosford, Sir J. M. Stronge, Bart., Colonel Caulfield, M.P., &c.—*Mark Lane Express*.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a. m.	2 p.m.	10 p.m.	
	in. cts.	in. cts.									
Sep. 21	29.55	29.85	54	65	55	Westerly	gentle	fine	sun	fine	dry
22	29.91	29.90	53	70	56	S. by West	gentle	cloudy	sun	cloudy	rain
23	29.84	29.80	52	60	56	Easterly	gentle	cloudy	cloudy	cloudy	rain
24	29.78	29.74	54	64	56	Westerly by N.	gentle	cloudy	fine	cloudy	rain
25	29.78	29.83	52	63	55	W. by North	gentle	haze	sun	fine	dry
26	29.83	29.80	53	61	54	S. West	gentle	cloudy	cloudy	cloudy	rain
27	29.80	29.72	49	62	56	S. West	lively	cloudy	cloudy	cloudy	shower
28	29.74	29.88	53	63	51	Westerly	gentle	fine	cloudy	cloudy	dry
29	29.88	29.40	46	61	53	S. West	va., str.	cloudy	cloudy	cloudy	shower
30	29.35	29.30	48	58	50	W. by S. W.	va., str.	fine	fine	cloudy	shower
Oct. 1	29.20	29.60	45	54	49	N. by West	lively	cloudy	fine	fine	shower
2	29.72	29.87	42	60	51	W. by N., Var.	gentle	cloudy	fine	fine	dry
3	29.88	29.90	51	55	50	S.W., E. by S.	gentle	cloudy	cloudy	fine	rain
4	29.90	29.83	47	56	52	S. West	calm	cloudy	cloudy	cloudy	shower
5	29.80	29.78	45	59	46	S. West	calm	fine	sun	fine	shower
6	29.78	29.45	41	55	52	S. West	lively	cloudy	cloudy	cloudy	rain
7	29.33	29.56	44	58	48	Westerly	strong	fine	sun	fine	dry
8	29.64	29.83	46	58	48	Westerly	brisk	fine	sun	fine	dry
9	29.90	29.99	42	56	46	S. West	airy	fine	cloudy	cloudy	dry
10	30.00	29.94	41	56	46	North	gentle	fine	sun	fine	dry
11	29.95	30.15	41	50	40	N. East	lively	cloudy	cloudy	fine	shower
12	30.30	30.34	39	53	40	N. by W., by E.	gentle	fine	sun	fine	dry
13	30.30	30.17	35	49	44	W. by North	gentle	cloudy	cloudy	cloudy	dry
14	30.13	29.96	41	48	46	S. Westerly	rising	cloudy	cloudy	cloudy	dry
15	30.00	30.09	42	54	45	N.W., Southly.	gentle	fine	sun	fine	dry
16	30.09	30.09	35	57	46	S. Westerly	gentle	fine	sun	fine	dry
17	30.09	30.08	41	57	48	W. N. W.	gentle	fine	fine	fine	dry
18	30.10	30.10	45	—	52	W. by North	gentle	fine	fine	fine	dry
19	29.97	29.90	49	56	50	W. by North	gentle	cloudy	cloudy	fine	dry
20	29.93	29.88	46	54	46	Northerly	gentle	cloudy	cloudy	cloudy	rain
21	29.88	30.04	39	52	—	N. by East	brisk	fine	sun	fine	dry

ESTIMATED AVERAGES OF OCTOBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.61	28.74	68	27	48.6

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
57.46	45.5	51.48

WEATHER AND PHENOMENA.

September 21—After night rain, most fine. 22—Slight rain early. 23—Equinox; mild, rainy at times. 24—Fine; great shower. 25—After haze, moist heat; beautiful. 26—Overcast. 27—Changeable, rainy night. 28—Fine and genial. 29—Gleams; small showers. 30—Fine lively day; some lightning after 7 p.m.; wind and rain.

LUNATION.—Last quarter, 28th day, 9h. 53m. afternoon.

October 1—Changeable; gleams and showers. 2—Clouds and gleam. 3 and 4—Changeable; hint of rain. 5—Short hail shower. 6—Wet in

the evening. 7 and 8—Fine; sun; much wind. 9—Fine; Overcast. 10—Fine; cloudy; sun. 11—Cold and shower. 12—Fine and keen. 13—Gloomy. 14—Changeable. 15, 16—Exceedingly fine. 17 to 19—Dry, though with clouds. 20—Changeable; a mere hint of rain. 21—Brisk, lively air; bright sun.

LUNATIONS.—New moon, 5th day, 2h. 55m. afternoon. First quarter, 12th day, 2h. 30m. morning. Full moon—21 day, 3h. 11m., morning.

REMARKS REFERRING TO AGRICULTURE.—A moderate supply of rain in the second week acted wonderfully upon the turnips, and, at the same time, brought the land into fine condition for the plough. The returning drought has proved most favourable to the later potatoes. Springs will be—nay, are very low. More rain has fallen in localities not remote.

J. TOWERS.

Croydon.

ON MIXING SOILS.

Much light has recently been thrown on the proper principle of mixing soils. It has been so long known as an axiom in farming, that while certain mixtures of soils produced the most wonderful effects, other mixtures, in appearance equally plausible, had no beneficial tendency whatever. So completely is this admitted, that it has grown into a proverb more worthy of quotation from its acknowledged truth than the merit of its poetry, which is confessedly of a very doggrel character. It runs—

“Clay upon sand,
Makes land;
Sand upon clay,
Throws money away.”

Now, while vast quantities of sand will only produce a stratified mixture, and add neither to friability nor productiveness; a small quantity of clay on a light blowing sand will effect an almost entire change in the absolute character of the land. It will bind the soil, and prevent its blowing; it will give it the power of maturing crops of wheat and beans; it will enable it to “hold manure”; it will remedy the destructive disease called “fingers and toes”; nay, it will improve the soil for the production of any crop whatever. Many of these qualities we may readily understand. But the power of holding manure is elucidated most satisfactorily by the experiments of Professor Way, “on the absorptive powers of a soil, of which clay forms an important constituent. “We alluded before to this discovery, made really by Mr. Thompson, and carried out and elaborated by the professor; and without tiresome details, uninteresting except as illustrative of facts, we may observe that pipe-clay, in certain favourable conditions, would absorb .2010 per cent. of ammonia, while Mr. Huxtable’s soil would absorb as much as .2366 per cent. Now, as Mr. Huxtable’s soil, which is described as a loam—an open friable sand, as we may call it, with clay sufficient to render it mechanically sound—had more power to absorb ammonia than pure clay, it gives an immense importance to the value of clay in a loose sandy soil, and indicates the value of a bed of clay under sand as being little short of a Californian mine.

It is easily conceivable how a porous soil, through which a small portion of clay is diffused, is more retentive of manure than either a pure clay or a pure sand. In the one the entire mass runs through like a sieve: in the other it cannot per-

colate at all, and comes in contact only with the upper surface; but in a sandy soil, through which a clay is mixed and diffused, the case is entirely different. Large surfaces of the clay are presented to the manuring medium, while the liquid will pass through, leaving in its passage the elements over which the clay possesses the detaining power.

Now, it so happens that there are few extensive tracts of sand which have not, either in the valleys, or at least below the surface-marl, clay, or loam, each more or less fitted for mixing with the greatest advantage. In all the most unmanageable sands, this holds good as a rule; and though the distance of a valley may sometimes be an element of cost, or the depth of an under-stratum a very serious source of expense, still the situation must be extremely unfavourable when the getting, removal, and spreading will cost more than sixpence per cubic yard. But it often happens that a stratum of clay will be found in some hill-side, and so be easily obtained—dispersed with facility, and the appearance of the soil absolutely improved by its removal. Now, as two hundred cubic yards will be an ample dressing for the very worst sand imaginable, the cost will not, in any ordinary case, exceed five pounds per acre; but as one hundred cubic yards will often answer, and, in the majority of cases, certainly one hundred and fifty, the cost between the blowing sand and the fertile crop-growing soil is really a consideration of only some three pounds ten shillings an acre—an amount which, even in these times of low prices, two years’ crops would generally repay.

The best period of laying on the clay is the autumn, because the pulverizing effects of the winter rains and frosts will tend more completely to break down and facilitate the assimilation of the mass, and the thorough incorporation and mixture of the soil, and the application; and the best crop to succeed is one of turnips, which, by being consumed on the land with sheep, still further aids the speedy consolidation of the soil, and tends to fit it for the production of the cereals.

Until lately, the *kind* of clay or marl was a subject of anxiety, and to a certain extent it may be so, but for a very different reason from that which is generally assigned. It was believed the good effects of the application depended on the fertility possessed by the clay itself. Thus, shell-marl was preferable to clay, and rightly; because, in all probability, the remains of organized beings which it

contained, possessed small quantities of phosphoric acid—an element of which the soil was previously destitute. But this is a mere accident in the application, which a few dissolved bones will at once effectuate, and is quite a secondary consideration.

The only drawback to fertility which need be dreaded, is the presence of some element inimical

to the growth of plants, which a deep-lying stratum may sometimes possess. This, however, is generally washed out or oxidised, and rendered harmless, if, as we hinted, the work be effected in the autumn, an object which all parties, wishing to clay their sands, should, for various reasons, endeavour to accomplish.—Gardeners' and Farmers' Journal.

CALENDAR OF HORTICULTURE.—NOVEMBER.

RETROSPECT.

From our last to the middle of October instant, the weather, though changeable, retained its dry character, no rain of any quantity sufficient to penetrate the subsoil having fallen. A really strong wind (felt severely on the south-east coast) occurred on the 7th, but the atmosphere was clear and bright as possible in our locality.

Superstitions—those banes of the mind—ought to be banished as speedily as possible. This remark is made because many persons have entertained dread of a "Saturday moon." Now, the three lunations of September 21st, 28th, and Oct. 5th occurred on Saturdays; yet who could venture to say that the weather had been disastrous? Cool it was; the temperature (at Chiswick at least) being quoted some degrees below the usual average; yet what then? We have been favoured with moderate showers, refreshing to—if not saturating—the ground; fine alternations of really warm sun and gentle airs, without any equinoctials, save and except the gale of the 7th: and on the 16th morning, for the first time, a really strong rime was discoverable after sunrise; but the wind veered to south, and it passed away rapidly. So far, then, every crop is firm, luxuriant, and plentiful: white broccoli superb, and Regents potatoes (the most delicate of autumn tubers) extremely good.

CHEMICAL PHENOMENA.

We acquire at length some idea of the operation of manures: every day's experience adds to or confirms the knowledge of facts. Manures, solid or liquid, if they enter a loamy soil fit for the propagation of good vegetables, or of farm crops, are attracted; and those constituents, which really enrich the staple, and become fixed in it so firmly that rain, however forcible and abundant, cannot displace them. But this is not all: the agency exerted between the earth and the manure is strictly electro-chemical; for not only are the ammonia and its humates attracted, but chalk which might have existed in quantity too small, or in a condition so masked as scarcely to be traceable, is detected, and expelled with water in the state which

we term "hard," that is, holding in solution muriate, sulphate, and carbonate of lime. We have already learned enough to arouse the inquiring mind to deep reflection and searching experiment. Honour to Professor Way! for, verily, he has performed worthy service! As facts come to light I hope to do them justice: in the mean time, a trial with guano-water, so weak even as a quarter of an ounce in sixteen ounces of rain-water, will expel chalky hard water from a column of loamy soil, to an extent that must astonish anyone who has not proved the fact; while every particle of the ammoniacal parts of the phosphates, &c., and the organic colouring matter of the guano, are fixed in the soil. The reader is referred to a previous article in this number.

VEGETABLE DEPARTMENT.

Peas and early broad-beans.—They who cannot command frames or some kind of glazed erection, and yet aim at early crops, must sow the seed an inch or two deeper than usual, or cover the site of the rows with a quantity of litter of some kind. Old tan, or half-reduced leaves of fern will do well. Another precaution should be adopted: mice are apt to make very free with leguminous seeds. At the time of sowing, a quantity of chopped furze should be scattered in the drills: this is found to warn off the intruders: at the same time, however, a good cat or two, and a number of the "figure of 4" brick traps, are strongly recommended.

Short-top radish and salads.—Sow under cover of glass, if possible, once or twice in the month; or select a small warm plot, and cover with dry fern or straw in cold nights, raking it aside when the weather is open and fine.

Lettuces planted upon ridges will stand the winter better than upon level damp ground, or in trenches; they ought, however, to be in frames where air can be freely given every fine day. Slugs are sad enemies to these tender plants, and ought to be sought for.

Celery has generally ceased to grow; in which case, and particularly in dry weather, the leaves

should be collected together by one person, while another breaks up the fine earth, and applies it fully and very high about each plant.

Endive.—Treat some of the largest plants much in the same way, and then place some slates ridge-ways along a row, to ward off rain and light.

Sea-kale.—If this plant were always consigned to the litter-ground, and made to grow within low brick walls, the garden would be rid of a troublesome nuisance. Pots could be equally well placed on the kale; be surrounded with warm dung or leaves, and protected with a few boards resting on the low walls. It is well to commence with the earliest crop, in the first week, and to proceed fortnightly till March. The early *scarlet rhubarb* can be excited at the same early period, or in pots placed in a dark cellar.

Artichokes.—Remove the old stalks and decaying leaves; hoe the surface, and throw several inches of moist decaying leaves among the plants. Some use half-decayed long manure: then cut the edges of the beds, and scatter some of the soil over the leaves, &c.

Asparagus, if not already dressed for the winter, the haulm cut, and the seeds (of which a pint or two of the finest might be saved) swept off, ought to be no longer neglected. We object *in toto* to the old method of deeply manuring and moulding-over at this season: rather let the surface be neatly raked over almost to the crowns, as no degree of frost has been known to injure this hardy native, and so remain till the approach of spring. Forcing can now be commenced, according to the process with beds of leaves repeatedly described: dung-pits will, of course, answer perfectly well.

Cauliflowers.—Admit air freely in fine weather to the plants in frames, or under glasses. In mild rainy weather the glasses may be tilted. Remove every decaying leaf from time to time: watch the slugs, and to prevent or destroy them give a light dusting of lime on the surface of the mould. Lime can thus do no mischief, for its direct chemical action is to attract and fix humic acid, as an almost insoluble humate, thus retaining the nutritive element in close juxta-position with the roots: this action of lime is specific, and should be remembered.

Winter and Flanders spinach out to continue fit for drawing up, or cutting out in thinning order to be used for the table, till the plants stand singly an inch or more asunder. We deprecate over-thinning prior to winter, as many plants are apt to fail. Keep the soil free of weeds.

Potato.—Some advise to leave the tubers long in the ground: others say "they ought now to have been in store." True it is that the ground tends

mainly to preserve the vitality of the tuber, but few persons perhaps would find that, in point of mealiness and flavour, it would be equal to one carefully stored in October. Time must prove how the stock will keep: it is good, and we trust that a "winter of our discontent" will not again be on record.

Carrots and other tap-rooted vegetables, also some of the Jerusalem artichokes, take up; dry, and store in sand for the supply of winter.

Deeply dig, or trench, in the dryest weather, all the vacant plots, placing the freshest dung fully a foot below the surface. If the land, or subsoil, be loamy, manure can never be lost; its ammonia, as extricated, will rise and be seized by the loam: hence deep tillage is indicated, and so is the ridging of the heavier soils, to promote textural melioration by frost.

HARDY FRUIT DEPARTMENT.

The *wall vines* require the earliest attention; so soon therefore as the foliage is detached, let every shoot be pruned and regulated conformably with the habits of the trees. Vines bleed if pruning is deferred till the approach of spring; and as fruit is borne on the shoots of the ensuing year, 1851, that will then be produced from the wood of 1850, so it must be evident that unless the pruning be performed, not only upon this principle, but at a time when the wounds are effectually healed by drying, the quantity and quality of the crop must suffer: therefore we say, prune short; that is, almost to one eye, or an inch above it, within the third week, and secure the branches on the wall or trellis: then point over the ground, and mulch the surface.

If time do not press, defer the regulation of spur-bearing and stone-fruit trees till the turn of the year, also of the berry-bearers. *Figs* must be covered with mats, or their branches interlaced with twigs of spruce fir; so to remain untouched till April.

All deciduous trees may be moved, or introduced at any time, and more advantageously perhaps than later, as they frequently emit a few rootlets before frost sets in: they should, however, for that reason, be thoroughly protected by mulch.

Strawberries in single row, or in beds of distant rows, may be safely divested of dead leaves only (never of the greener foliage), and the spaces covered with brown decaying tan: this is found to be a useful dress.

The *fruit-room* demands attention, in order to remove decay. Lindley's *Guide* tells us that "if clean dry fern can be had, the fruit should be laid upon it, reserving as much as will cover it over as soon as frost sets in. Fine dry fern is by far the

best thing on which to lay apples, and to cover them also, of any material whatever, as it is perfectly sweet, not liable to contract any unpleasant smell, and keeps sound much longer than straw."

ORNAMENTAL DEPARTMENT.

Look over the budded *roses*, and loosen the ties, that the bark may not be grooved. Protect some of the tenderer varieties (as *Jean de Pretz*) with fir-boughs tied carefully among them. Plant standard roses, and in doing so trench deeply; introduce mellow turfy loam with some decaying leaves, fern, or horse-droppings: when settled, spread out the roots four to six inches below the surface-level; cover with loam; water; secure the stem to a stake, and finish with a good coating of old manure or tan.

Planting of all kinds may be made upon similar principles, allowing for varieties of soil and habits.

Plant bulbs. *Hyacinths* in pots can be set in pits, and covered for the winter deeply with river-sand or ashes.

Make the borders, parterres, shrubberies and lawns neat, and keep them so.

The weather remains dry and extremely beautiful. This day (Oct. 21) is cool, with a wind brisk from N. by E., brilliantly sunny. Water certainly will soon be required to supply the subsoil, and renew the springs. Everything, however, is very favourable, and particularly to the ripening of fruit wood. Grapes have been severely visited by mildew, and many crops have perished. The leaves on wall trees do not seem injured. In future, resort should be had at first to flower of sulphur.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR OCTOBER.

The continued fineness of the weather has enabled our agriculturists in nearly all parts of England to work the land advantageously. Both ploughing and sowing have progressed with scarcely any interruption, and a large portion of the autumn wheats have been somewhat earlier than usual. Much difference of opinion still exists on the subject of the actual deficiency in the crop of wheat produced this season. Some parties calculate the yield at from four to five million quarters short of that of 1849; but we conceive that such statements ought to be received with great caution. It is quite true that in many districts—such, for instance, as those in the midland counties—the falling off is from one to two quarters per acre; but we doubt much whether in some localities a fair average quantity has not been produced.

The extreme anxiety manifested some time since, respecting the safety of the potato crop, no longer exists. Some of the growers affirm that the produce is considerably less than was that of 1849; yet it is evident that the total growth is a large one, and we may observe that the losses by disease are comparatively trifling. The metropolitan and other markets have been liberally supplied with all kinds in excellent condition, and which have sold at low prices, viz., from 40s. to 80s. per ton. Scarcely any arrivals worthy of notice have taken place from abroad; but large supplies may be shortly expected from Holland, France, and Belgium. Most of the potatoes have now been raised in the United King-

dom; and the result of our inquiries is such as to warrant the supposition that very moderate currencies will rule between this and the end of the year.

Although there has been a shortness of grass in some of the grazing counties, stock, generally speaking, has fared extremely well, and we are glad to be enabled to assert that few losses have been sustained by disease. The supplies of both beasts and sheep on most farms are unquestionably large, yet the supplies forwarded to the various markets have not been much in excess of former corresponding periods. From abroad very extensive imports have taken place, notwithstanding the low currencies ruling here, and which have materially interfered with the consumption of linseed as well as linseed-cake, the latter of which is still selling at unusually low currencies.

The general produce markets have ruled somewhat active, and a large amount of business has been transacted in them, at remunerative prices.

The growth of hops having turned out a very extensive one as to quantity, and good as to quality, the duty has advanced to £230,000. On the whole, very large sales have taken place, and really fine East Kent pockets have realized in the Borough £7 per cwt. The quantity of yearlings and old hops now on hand is unusually small, and we have had the novelty of a large public sale in order to get rid of the stock.

The hay markets have been well supplied. Both hay and straw have sold heavily—the former at from £2 8s. to £3 15s.—the latter £1 1s. to £1 8s. per load.

The turnip and other bulbous crops are turning out extremely well.

Advices from Ireland and Scotland are generally favourable as regards the yield of this year's crops. Large shipments of new oats have already taken place from most of the Irish ports to London and Liverpool, and several cargoes of potatoes have been reported from Scotland. The numbers of live stock forwarded south have materially fallen off.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Large as the supplies exhibited in Smithfield may appear from the statement below, it is obvious that those of home-fed stock have been comparatively small. The great increase in the foreign importations is chiefly to be attributed to the warlike operations in Schleswig Holstein, and which have induced many of the graziers to forward their stock to London rather than run the risk of having it taken by the Danish army. At least two-thirds of the beasts at hand during the month have been derived from Tonnigen, one of the ports not blockaded by the Danes; yet the receipts from Holland have been seasonably large. The immense influx from abroad has naturally induced caution on the part of the English feeders in supplying our markets; nevertheless, nearly 5,500 head of beasts, including foreigners, were shewn on one day in the metropolis. The rates of freight from the continent to Hull and the other northern outports continue low, yet the bulk of the supplies is still directed towards the Thames, and a portion of the cattle has been landed at Harwich, and forwarded thence per railway. We are informed, however, that the expenses are fully 7s. per head more than if the stock were sent direct to Blackwall. The condition of the foreign beasts is still anything but first-rate, but that of the sheep is undoubtedly improving, most of them carrying a very large quantity of internal fat. About 20 beasts have been shipped from Vigo for Southampton, but nearly half of them died on the passage. For each kind of stock the demand has ruled excessively heavy, and most breeds have fallen in value quite 2d. per 8 lbs. The following importations have taken place into London:—

	Head.
Beasts	5,939
Sheep	20,982
Calves	1,312
Pigs	1,702
Total	29,935

IMPORTS AT CORRESPONDING PERIODS.

	Oct., 1847.	Oct., 1848.	Oct., 1849.
Beasts	5,433	2,962	5,008
Sheep	17,635	10,669	16,190
Calves	1,225	803	565
Pigs	433	116	243

The above shows clearly enough that low prices, according to the predictions of the free-traders, have not had the effect of checking the arrivals from abroad.

The total numbers of stock shewn in Smithfield have been as under:—

	Head.
Beasts	23,116
Cows	440
Sheep	138,110
Calves	2,120
Pigs	3,615

COMPARISON OF SUPPLIES.

	Oct. 1847.	Oct. 1848.	Oct. 1849
Beasts	19,509 ..	20,177 ..	22,477
Cows	572 ..	487 ..	457
Sheep	126,480 ..	114,760 ..	146,200
Calves	2,000 ..	2,200 ..	1,946
Pigs	2,713 ..	3,140 ..	2,085

The English bullock droves have been thus derived:—

Northern districts	11,900
Other parts of England	2,100
Scotland	100
Ireland	74

The remainder of the supplies has been mostly derived from the neighbourhood of the metropolis.

COMPARISON OF PRICES.

	Oct., 1847.		Oct., 1848.	
	s. d.	s. d.	s. d.	s. d.
Beef	4 0 to 4 10 ..	2 4 to 4 0		
Mutton	3 8 to 5 2 ..	3 4 to 5 0		
Veal	3 8 to 4 8 ..	3 0 to 4 2		
Pork	4 0 to 5 2 ..	3 10 to 4 10		
	Oct., 1849.		Oct., 1850.	
	s. d.	s. d.	s. d.	s. d.
Beef	2 4 to 3 10 ..	2 4 to 3 10		
Mutton	2 8 to 4 0 ..	2 10 to 4 0		
Veal	3 0 to 3 6 ..	2 6 to 3 8		
Pork	3 2 to 4 2 ..	3 0 to 4 2		

Newgate and Leadenhall Markets have been somewhat heavily supplied. The general trade has ruled heavy, and prices have had a downward tendency.

REVIEW.

THE FAMILY HERALD.

London: George Bigg, Strand.

If the works of Cruikshank, from the exuberance of his pencil and pen, require to be seen to be appreciated, so we say of this cheap literary periodical, that it is impossible to form any opinion of the fund of amusement weekly issued for one penny, without possessing ourselves of the "Family Herald." The publisher may, too, with the aforesaid quiz, be called "the matchless

and inexhaustible GEORGE." We extract the following beautiful piece of poetry by Emily Varndell. In a former number we gave a review of this poem, with a musical arrangement by Miss Morris of the Royal Academy of Music, and which has been sung by Miss Hayes, the English nightingale. Want of space then prevented our giving the words, which, for gentle pathos and fine feeling are unrivalled:—

" Life passes from me, mother—oh, so rapidly away ;
Ethereal voices speak to me—they will not let me stay :
Oh ! there are dark forebodings all entwined around my heart,
And they tell me, dearest mother, that thou and I shall part.

" Oh ! let me see the sunshine, and the gay and glorious earth,
With all its bright and beautiful just budding into birth ;
They told me when the spring-time came, with song of birds
and flowers,
That I should rally and revive amid its genial hours :

" They told me—but it was not true—I feel its falsehood now,
The signet of the shadowy laud is set upon my brow.
It is a long, long journey—I am going all alone :
The pathway to the spirit world is distant and unknown.

" Nay, mother, dearest mother ; nay, I would not have thee weep—
Oh ! is it not a gentle thing to lay one down and sleep,
Away from all the weariness, the sorrow, and the pain,
Which make the fairest things of life so empty and so vain ?

" I would not have thee mourn for me, and grieve when I am gone,
For when the star of life shall set, and hour of death come on,
Thon'lt join me where, within those realms, those regions of the blest,
'The wicked cease from troubling, and the weary are at rest.'

" The shades are gathering o'er me fast—alas ! I cannot see ;
Life's bark is tossed upon the waves of lone eternity :
The waters rise around me, they engulf my wavering breath—
Oh ! mother, take my hand in thine, this is the night of Death !"

REVIEW OF THE CORN TRADE DURING THE MONTH OF OCTOBER.

From the time at which we last addressed our readers up to the present period the weather has been as auspicious for all kinds of out-door labour as could possibly be desired. Sufficient rain fell towards the close of September and early in October to bring the land into fine condition for ploughing, and no time was consequently lost. The work was commenced in earnest almost as soon as the harvest was concluded, and, having since met with no interruption, very rapid progress has been made.

Large breadths of land have been sown with wheat, and rarely has the seed been put into the ground under more auspicious circumstances. Farmers have of late been so closely occupied with this and other out-door labours as to allow little leisure for thrashing : hence a considerable falling off has taken place in the supplies from the growers ; and there is yet so much work to be accomplished as to render it probable that the deliveries from the growers will prove short throughout the greater part of November.

Nothing has transpired since the completion of harvest to lead to the belief that the deficiency of the wheat crop of the United Kingdom has been exaggerated. Careful inquiry among our agricultural friends, and reference to the best cotemporary authorities, have tended to confirm our previous opinion on this subject. We have no definite data by which we can ascertain what an average produce for the United Kingdom ought to be ; indeed, there are no official statements of any kind to assist in forming an estimate ; it is not even known how many acres are devoted to the growth of particular crops ; and it will, therefore, at once be seen

that accuracy can hardly be expected where we have no acknowledged groundwork on which to base a calculation. This is, however, certain—that the yield of wheat to the acre falls materially short of the quantity secured last year, on all descriptions of soil ; and in but few instances does it come up to what may be considered the average of moderately good seasons.

Farmers are, therefore, ill prepared to meet the present ruinously low prices ; and those who have not realized capital to fall back upon can scarcely be expected to surmount the difficulties of their position.

On a large portion of the fen lands in Lincolnshire and Cambridgeshire the wheat was badly lodged early in the season, and subsequent storms of rain and wind did further mischief ; the corn did not ripen in the regular way, but became shrivelled and dried up before it arrived at maturity ; the yield in those districts is, consequently, miserably short—in many cases not more than two to two-and-a-half quarters to the acre ; and for this description of wheat the growers have been glad to take prices varying from 24s. to 30s. per qr. The produce of the home counties may be regarded as a fair sample of the more favoured parts of the kingdom ; but our Essex, Kent, and Suffolk farmers are almost unanimous in stating that they have not an average ; and as the best runs of red have at no time since harvest exceeded 44s. to 45s. per qr. at Mark-lane, whilst the present value is only 40s. to 42s. per qr., it may be easily conceived that farmers, as a body, cannot be making a return for their outlay and industry.

However much we may lament this state of affairs, there is little in the prospects for the future of an encouraging nature. Prices may, perhaps, during the winter months range a few shillings per qr. higher; but no advance by which the British grower can expect to be benefitted is likely to take place. The slight rally which has lately taken place has been caused solely by the falling off in the deliveries from the growers; and so long as the sowing of wheat &c. occupies farmers, and prevents them bringing forward supplies, the tendency will continue upwards, enabling the importers of foreign to obtain better terms; but when our own growers again begin to thrash freely, which they will certainly have to do to raise funds to meet Christmas rents, they will probably have to sell at similar rates as before.

Notwithstanding the low value of all kinds of grain in our markets, not a week elapses without large arrivals from abroad; and though we hardly expect that the supplies of foreign will continue on so liberal a scale much longer, still there is little prospect of any scarcity being felt, as stocks in granary have lately been accumulating at most of the principal ports, as well as in London. It is useless to say that imports cannot be made with profit: this has been the case all through the present year; still shipments have been made, and continue to be made, from continental ports to this country. The fact is, that merchants and speculators require but little encouragement to enter into fresh engagements, and any appearance of improvement in prices suffices to cause purchases to be made abroad.

The late abundant imports may be accounted for by the temporary improvement which took place in the tone of the trade immediately after harvest; this was by many regarded as the commencement of a material rise; and, to be prepared to profit by the same, large orders were transmitted to the continent for the purchase of wheat. On most of these operations the parties concerned unquestionably lost money, still there are others to follow the same course; and even now a considerable advance is reckoned on, by the more sanguine, either during the approaching winter or in the spring of next year, and orders are from time to time sent to the Baltic, to France, and to America, which promise to afford a succession of supplies. The foreign merchants are also anxious to try the English markets whenever there is the slightest chance of making a profit; hence consignments are constantly coming forward, and it may be regarded as certain that, with open ports, we shall never be long without large supplies from some quarter or other.

We will not speculate on the chances for and

against a return to protective duties; but that something will have to be done to put our farmers on a fair footing to compete with the foreign growers, or that the land must go out of cultivation, is certain.

There has not been much change in prices since the close of last month. Early in October the tendency was decidedly downwards, as well at the large consuming towns as at the principal markets in the agricultural districts, but latterly a slight rally has taken place.

At Mark-lane business has remained more depressed than elsewhere, owing to the abundant arrivals of foreign-grown grain, &c., and the fact that the large town millers, dealers, &c., are all tolerably well stocked.

The arrivals of wheat coastwise into London have, till within the last fortnight, been liberal; and a fair quantity has come forward by land-carriage samples from the neighbouring counties. In the early part of the month the supplies exceeded the demand, and factors had no alternative but to submit to reduced rates. On Monday, the 7th inst., the Kentish and Essex wheat was with difficulty placed at prices 1s. to 2s. per qr. lower than those current on that day week, on which latter occasion a similar abatement had already taken place. Since then factors have manifested less anxiety to realize, and the millers have shown rather more inclination to buy; still the trade has been far from lively, and, notwithstanding a rally of about 2s. per qr. in many of the country markets, quotations have hardly undergone the slightest improvement in the metropolis. There was certainly an increase of firmness on the 14th October, and this continued throughout the succeeding week; but neither then nor on the 21st could any portion of the decline which occurred on the first Monday in the month be recovered. Fair runs of red wheat have lately been selling, and may still be bought, at 40s., and the finer kinds at 42s. whilst for white 46s. to 48s. per qr. may be regarded as extreme quotations.

The offers from the east coast have not at any time been numerous, better prices having been obtained for the produce of Lincolnshire and Cambridgeshire, at the leading Yorkshire markets, than with us.

The transactions in foreign wheat have been on rather a retail scale, and the quantity received has greatly exceeded that required for consumption. During the first three weeks in the month 85,000 qrs. arrived into the port of London, and the country demand having at no period been active, importers have been obliged to land for want of buyers; they have preferred adopting that course to forcing sales; and, notwithstanding a want of

activity in the trade, previous terms have been supported with considerable firmness.

Good qualities of red, comprising Baltic, French, and Belgian, have been held at 40s. to 44s., and for superior new Rostock, of 62 to 63 lbs. weight, 48s. per qr. has been asked. Though there is more Dantzic than any other kind of wheat at this port, holders have manifested no particular anxiety to realize, the prevailing belief being, that the arrivals from thence will now fall off and be short until the spring of next year; moderately good parcels have been held at 44s. to 46s., and fine 46s. to 48s. per qr.; indeed, any choice would probably bring 50s. per qr.

Some business has been done during the month in floating cargoes of wheat; for Polish Odessa 38s. to 39s., and for hard Syrian, of 60 to 62 lbs. weight, 31s. per qr. (cost, freight, and insurance), has been paid. The transactions would probably have been more extensive if sellers had been more yielding, but they have in general shown more disposition to raise than to lower their pretensions. The top price of town manufactured flour has remained stationary, at 40s. per sack, throughout the month; the bakers have conducted their operations with caution, and, having had a fair choice of foreign to select from, have in some measure been independent of the millers; the constant influx of French flour is very severely felt by the London milling trade, and at present there appears little probability of the supplies from thence falling off, there being at present some margin for profit on importations from that country. The arrivals have averaged over 4,000 sacks per week, in addition to which we have had moderate receipts from America. The quality of the latter is not so fine this year as in former seasons; the best brands have sold at 22s. to 23s., and the commoner kinds 1s. to 2s. per barrel lower. French flour of moderately good quality has commanded 30s. to 33s., whilst superior Paris manufacture has realized nearly as much as the best London marks.

The arrivals of English barley have not been large, and only a very small proportion of the supply has consisted of really fine malting qualities. The scarcity of the finer sorts has caused full terms to be demanded, and the extreme rates of last month have been realized; for choice samples, say 28s. up to 30s. per qr., but the latter price would only be given for really prime parcels. The ordinary sorts of malting and distilling barley have, on the other hand, been very difficult of disposal, the sale having been much interfered with by large receipts of foreign. Of the latter the aggregate arrival during the month has exceeded 29,000 qrs. The greater part of this supply has been composed of grinding qualities; and, though there has been a steady in-

quiry for the same, still the tendency of prices has been downward, and we consider all foreign barley about 1s. per qr. lower than at this time last month. This grain has, we believe, in proportion to the breadth sown, given a better return, in regard to quantity, than wheat; but the quality is much inferior to the growth of last year. On the continent the barley crop is said to have proved deficient, and prices are at present relatively higher abroad than in this country, which strengthens the notion that the imports will not hereafter be very large; and, as there are few articles better adapted for feeding purposes, any further decline in prices does not appear probable; at present, heavy qualities, weighing 53 to 54 lbs. per bushel, may be bought at 21s. to 22s. per qr., which, weight for weight, is cheaper than either oats or pulse.

The comparative scarcity of fine barley has caused the best kinds of malt to be held very firmly, and in some cases a small advance on previous prices has been established. The demand was, however, more active in the beginning than towards the latter part of the month, and we are inclined to think that prices have touched the top.

The arrivals of oats coastwise have been small, and the supplies from Ireland only moderate; but having had rather liberal receipts from abroad, the trade has remained in a dull languid state, with the turn decidedly in favour of the buyer. Really fine dry parcels of new, and the best fresh thrashed old oats have not given way in value, being worth as much at present as they were at the close of September. Inferior new black Irish, and all stale and ill-conditioned sorts of foreign, have gradually receded about 1s. per qr. Some of the new white oats from Ireland are remarkably fine, weighing 42 to 43 lbs. per bushel: these have been held, and are still worth 19s. to 20s. per qr. The colour of the Scotch of this year's growth is very bright, and the condition generally dry: fair qualities of feed may be quoted 20s. to 21s., and fine potato 23s. to 24s. per qr. Stocks of old oats of home growth seem to have been quite exhausted; and as new, however dry, are not considered suitable for feeding so soon after harvest, we have had a fair consumptive demand for old foreign. Archangel and Riga oats have brought former terms, say 16s. to 17s., and Danish and Swedish from 15s. up to 18s. per qr., according to weight and condition. The large dealers are still tolerably well stocked, but the total quantity on hand at this port is by no means excessive. The future range of prices will in a great measure depend on the extent of the arrivals from Ireland; all the accounts from the sister isle agree in stating that the yield of this crop has been good, and that the acreable breadth was large, but wheat having given a miserably short return in Ireland,

and the produce of potatoes being very deficient in different parts of the island, it is probable that an extra consumption of oatmeal will take place, which must diminish the quantity for shipment to England.

The transactions in beans have been on quite a retail scale at Mark Lane since our last monthly notice; sellers have, however, remained very firm, and neither old nor new have been parted with at lower terms. The arrivals coastwise have been moderate, and the supplies from abroad not large. Egyptian beans have slightly advanced in value, but not to an extent rendering it necessary to quote higher.

The rapid and important rise which took place in peas last month had the effect of drawing larger supplies to this market, and the large splitters having deemed it prudent to act on the reserve, a considerable re-action has taken place in the value of the article; white boilers have receded more than either grey or maple peas; but all kinds are lower than they were when last we addressed our readers. The fall on white from the extreme point is about 5s. per qr.; 33s. to 34s. being now the highest value; maples are worth nearly as much, and grey 31s. to 32s. per qr. Foreign peas range from 30s. to 33s. per qr.; but the sale for the latter has within the last fortnight become extremely difficult.

Having little or no Indian corn on the spot, and the article being only used here for cattle feeding, the operations have been quite unimportant. In floating cargoes a fair amount of business has been done, and nearly all that has been offered has been taken for Ireland; the latest prices paid have been 30s. to 31s. for Galatz, cost, freight, and insurance, which is an advance of fully 1s. per qr. on the terms previously current. This continued demand for Ireland leads to the belief that the merchants there are fully satisfied that the potatoes will not hold out through the winter, and a large consumption of Indian corn and low priced wheat seems to be confidently reckoned upon.

The continued depression in prices in the British markets has at length had some influence on the state of the grain trade abroad, and by the most recent advices from the Baltic we learn that holders had become rather more anxious to realize; still there had been no pressure, the idea that Great Britain would be compelled to import largely having in a great measure maintained the confidence of merchants.

Our Danzig letters are of the 19th inst., and state that the supplies of wheat had been small for some time, and that though the export demand had fallen off, and the trade become dull, still sellers had been unwilling to make any important concession. The general runs of old high mixed wheat had been held

at 40s. to 41s., and fine at 42s. to 43s. New, weighing about 61lbs. per bushel, might have been bought at 38s. 6d. to 40s. per qr., free on board. Prices in the interior of Poland were relatively higher, and it was therefore considered that the supplies from thence would prove lighter than usual. The quality of the new wheat is not highly spoken of; but judging of the samples which have come under our personal notice, we are decidedly of opinion that there is little to complain of on that head. Freight to London and the east coast of England was 3s. 3d., and to the east coast of Scotland 3s. per qr., for wheat; but no charters had for some days been closed.

Konigsberg letters of the 19th October state that much rain had fallen in that neighbourhood, which had had the effect of causing the roads to become so bad as to render it difficult to send forward supplies, and that the market had consequently been but poorly provided with grain. This circumstance and the slight increase of firmness in the tone of the English advices had caused full prices to be asked. High mixed wheat, of 61½lbs. weight, was quoted 38s. 3d. to 39s. 3d.; mixed, weighing 61 lbs., 36s. 6d., and red of the same weight 36s. per qr., free on board. Spring corn and pulse had been held firmly; barley at 16s. 3d. to 17s. 3d., oats at 10s. 9d. to 11s. 9d., and beans and peas at 24s. to 24s. 9d. per qr., free on board.

At Stettin, on the 21st, prices were rather more moderate than they had been in the early part of the month, fair qualities of old red and mixed wheat, weighing 61lbs. per bushel, having been offered at 37s. to 38s. per qr., free on board. Barley had come sparingly to hand; new Pomeranian, of 52 lbs. weight, had realized 17s., and new Oderbruch, of 51lbs. weight, 19s. per qr., free on board.

The advices from the Lower Baltic ports describe the wheat trade as lifeless, holders having all along asked higher prices than the value of the article in the British markets has allowed of being paid. In the early part of the month the supplies from the growers had, it appears, been very small, owing to farmers having been busily engaged with field work; subsequently some increase took place in the deliveries, but not to an extent to have much influence on prices.

Our Rostock letters are of the 21st inst.; the quality of the new wheat is admitted to be fine, but the yield is not so well spoken of. Supplies having rather increased, fine parcels of new, weighing 62½ lbs. per bushel, had been offered at about 40s. per qr., free on board, and a few bargains had been closed at that rate. Barley had been in good request for local consumption, and had realized equal to 17s. 3d. per qr. free on board. Vessels were getting rather scarce, and an advance in freights

was expected: the last charter for wheat had been at 3s. per qr. for the east coast of England.

At Anclam, on the 19th inst., the top quotation for wheat was 40s., and for barley 17s. per qr. And at Stralsund, on the same day 61½ lbs. new wheat was offered at 39s., and 52lb. barley at 16s. 6d. per qr.

At the near continental ports prices have been influenced by the reports from hence, but the decline has not been in proportion to the fall which has taken place here.

Hamburg letters of the 22nd October inform us that though the demand for wheat had been very slack, holders had remained tolerably firm, and for red upland on the spot, weighing 61½ lbs., 38s. 9d. to 39s. 3d., and for fine samples of 62½ lbs. weight 40s. per qr., free on board, had been asked; freight per steamer to London was 1s. 6d. per qr. Barley had been in good request, and for superior Saale, though weighing only 49lbs. per bush., equal to 24s. per qr., free on board, had been paid; from the Danish islands there had been offers of 53½ lbs. qualities at 17s. to 17s. 6d. per qr.

At Rotterdam, on the 21st inst., both white and red wheat was difficult of disposal; fine old and new Zealand was quoted 40s. 3d. to 41s. 3d., and middling to good qualities 37s. 6d. to 39s. New Rhine wheat varied in value from 37s. up to 45s. per qr., the weight of the ordinary sorts being scarcely 60lbs., whilst picked samples weighed 63 lbs. per bushel. Oats had come to hand sparingly, as well at Rotterdam as at Emden, Groningen, &c., and prices of the article are relatively higher in Holland than in the British markets.

From Antwerp we learn that the supplies of wheat from the growers had been small, and that notwithstanding the want of an active foreign demand, good old 62lbs. Louvain had been held steadily at 44s., and new at 42s. to 43s. per qr., free on board.

In some of the French markets rather an important decline took place in the early part of the month, which led to purchases of flour on English account, and by the latest advices from thence it appears that a rally had again taken place, which may probably have the effect of checking shipments from thence to this country.

The accounts from the Mediterranean are not of much interest; letters from Marseilles of the 19th October, state that very little had been done there in wheat; Polish Odessa, of 60 to 60½ lbs. weight, was quoted 32s. to 32s. 6d., and superior parcels 33s. to 34s. 6d. per qr., free on board.

From Galatz we have advices of the 10th inst. Considerable purchases of wheat had, it appears, been made on British account, which had caused prices to tend upwards: the best qualities were then worth 26s. 3d. to 27s. 3d., secondary 25s. 2d. to

25s. 8d., and inferior 23s. 1d. to 24s. 8d. per qr., free on board. Galatz Indian corn was worth 17s. 11d. to 18s. 4d., and Ibraila 16s. 1d. to 17s. 4d. per qr., free on board. Freights to call at Falmouth for orders, was 12s. 6d. to 13s. 6d. per qr. for English and Austrian vessels.

The letters from the United States confirm what had previously been said about the favourable result of this year's harvest in America. Supplies of flour had come forward so freely that prices had receded more or less at the principal markets, notwithstanding a lively demand for shipment to Great Britain.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	NEW.	OLD.
WHEAT, Essex and Kent, white	41 to 45	39 to 47
Ditto, fine selected runs	45 49	46 49
Ditto, red	37 40	40 41
Ditto, extra	40 43	41 42
Norfolk, Lincolnshire and Yorkshire ..	35 41	38 41
Ditto, white	37 43	40 43
BARLEY, English, malting and distilling ..	24 26	25 27
Ditto, Chevalier	27 29	25 26
Ditto, grinding	—	21 23
MALT .. Essex, Norfolk and Suffolk ..	43 45	44 43
Kingston, Ware, and town made ..	45 52	48 54
OATS, Essex and Suffolk	—	16 17
Lincolnshire and Yorkshire (Polands) ..	16 18	18 19
Ditto, feed	15 17	16 17
Devon & West Country, feed	—	14 16
Northumberland and Scotch, feed ..	20 23	20 23
Dundalk, Newry, and Belfast, potato ..	20 21	16 18
Limerick, Sligo, and Westport, potato ..	19 21	17 19
Ditto, feed	16 18	16 17
Cork, Waterford, Dublin, Youghal, and		
Cloumel, black	15 17	14 16
Ditto, white	—	15 17
Galway	—	12 15
BEANS, Mazagan	25 26	26 28
Tick	26 27	28 30
Harrow	26 30	28 32
Pigeon, Heligoland	28 33	30 35
Windsor	38 46	25 27
Long pod	30 36	25 28
PEAS, non-boilers	—	30 31
White, Essex, and Kent, boilers ..	31 32	30 32
Ditto, fine Suffolk	32 34	30 34
Maple	32 33	30 32
Hog and grey	30 32	30 32
FLOUR, best marks (per sack of 280 lbs.) ..	—	35 40
Norfolk and Suffolk, ex-ship	—	29 34
RYE	—	25 26

FOREIGN GRAIN.

	Shillings per Quarter.	
	NEW.	OLD.
WHEAT, American, white	42 to 46	
Canada	40 46	
Dantzic and Konigsberg	42 46	
Dantzic, fine white, extra quality	47 49	
Stettin and Hamburg	39 43	
Danish	38 40	
Rostock, Pomeranian and Rhine	40 46	
French and Belgian, white 42s. to 45s.	red 40 43	
Mediterranean, Odessa, and St. Petersburg ..	35 39	
Black Sea (nominal) hard to soft	35 38	
Buck or Brank	25 26	
BARLEY, malting	24 26	
Grinding and distilling	21 23	
Hamburg, Dantzic, Konigsburgh, and Riga ..	21 22	
Danish, Mecklenberg, and Pomeranian	21 22	
OATS, Dutch, brew. Poland, Friesland, and Groningen	18 20	
Danish and Swedish	15 18	
Russian	16 17	

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Sept. 14, 1850..	42	10	23	9	17	4	26	10	29	7	28	9
Sept. 21, 1850..	42	7	24	10	17	1	26	4	29	5	29	5
Sept. 28, 1850..	42	8	24	8	16	10	26	4	29	5	30	0
Oct. 5, 1850..	42	2	24	5	16	8	26	7	29	6	31	3
Oct. 12, 1850..	41	2	24	2	17	1	25	8	29	6	29	7
Oct. 19, 1850..	39	10	24	2	16	7	26	7	29	7	29	5
Aggregate average of last six weeks	41	10	24	4	16	11	26	5	29	6	29	9
Comparative ave. same time last year	42	0	27	6	17	9	25	3	29	6	30	6
DUTIES.....	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's Gazette.				Averages from the corresponding Gazette in 1849.			
Qrs.		s. d.		Qrs.		s. d.	
Wheat ..	87,478	..	39 10	Wheat ..	121,654	..	41 4
Barley ..	36,821	..	24 2	Barley ..	43,835	..	28 2
Oats	14,704	..	16 7	Oats	19,457	..	17 4
Rye	103	..	26 7	Rye	346	..	24 9
Beans	4,428	..	29 7	Beans	3,735	..	29 5
Peas	2,125	..	29 5	Peas	2,607	..	30 3

PRICES OF SEEDS.

BRITISH SEEDS.

Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3lbs. each) .. £8 0s. to £9 0s.
 Cow Grass (nominal)..... —s. to —s.
 Trefoil (per cwt.)..... 14s. to 18s.
 Rapeseed, (per last) new £25 to £27..... old £— to £—
 Ditto Cake (per ton)..... £4 15s. to £5 10s.
 Mustard (per bushel) white 6s. to 7s.; .. brown, 8s. to 10s.
 Coriander (per cwt.)..... 16s. to 24s.
 Canary (per qr.)..... new 50s. to 52s., fine 52s. to 54s.
 Tares, Winter, per bush, 4s. 3d. to 4s. 9d.; Spring, nominal.
 Caraway (per cwt.)..... new, 30s. to 32s.; fine 33s.
 Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.
 Cloverseed, nominal.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. .. 24s. to 42s.
 Linseed (per qr.).. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton)..... £6 0s. to £7 10s.
 Rape Cake (per ton)..... £4 10s. to £4 15s.
 Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 34s. to 36s.
 Tares, (per qr.)..... small 21s. to 24s., large 25s. to 30s.

BOROUGH HOP MARKET.

MONDAY, OCT. 28.

Our Hop market remains without any material alteration since our last report. The demand is limited, at the rates then current.

Sussex pockets 65s. to 78s.
 Wexod of Kent ditto..... 78s. to 90s.

WORCESTER, (Saturday last.)—There is no alteration to note in our market from last week, fine qualities maintain their price, and inferior move off slowly, and the supply decreases. In old Hops nothing doing.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Oct. 28.

The arrivals coastwise the last week have been limited, but we are so well supplied by rail that it is with difficulty the following prices are obtained;—

Yorkshire Regents.. 70s. to 80s. per ton.
 Perth 60s. to 65s.
 Fifeshire 55s., 60s.
 Wisbech and Cambridgeshire 60s., 65s.
 Foreign Whites ... 50s., 55s.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.		s.	
Friesland, per cwt.,	86	to	88	
Kiel	84		86	
Dorset	88		90	
Carlou	78		82	
Waterford	76		80	
Cork	80		82	
Limerick	74		78	
Sligo	76		78	
Fresh Butter, per doz.	11		12	
Cheshire Cheese, per cwt.,	52		70	
Cheddar do.	56		68	
Double Gloucester, per cwt.	46		54	
Single do.	44		52	
York Hams	66		76	
Westmoreland do.	68		72	
Irish do.	54		68	
American do.	38		50	
Wiltshire Bacon, green, ...	50		54	
Waterford Bacon ..	48		51	
Hamburgh do.	46		48	
American	30		36	

BELFAST, (Friday last.)—Butter: Shipping price, 76s. to 82s. per cwt.; firkins, 8½d.; crocks, 8½d. per lb. New Bacon 40s. to 46s.; Hams, prime, 64s. to 68s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 60s. to 62s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 42s. to 46s.; kegs or firkins, 40s. to 41s. per cwt.

Oct.	Butter, per cwt.	Bacon, per cwt.	Dried Hams, per cwt.	Mess Pork, per brl.
24.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.
1846	93 0 94 0	55 0 57 0	66 0 74 0	65 0 67 9
1847	93 0 94 0	55 0 66 0	75 0 82 0	77 0 80 0
1848	87 0 90 0	56 0 60 0	66 0 82 0	80 0 82 0
1849	82 0 84 0	48 0 50 0	68 0 75 0	76 0 78 0
1850	63 0 75 0	40 0 46 0	64 0 68 0	60 0 62 0

HIDE AND SKIN MARKETS.

Market Hides,	50 to 64lbs.	s. d.	s. d.	per lb.
Do.	64 72lbs.	0 13	0 2	"
Do.	72 80lbs.	0 2	0 3	"
Do.	80 88lbs.	0 3	0 4	"
Do.	88 96lbs.	0 4	0 4	"
Do.	96 104lbs.	0 4	0 4	"
Do.	104 112lbs.	0 0	0 4	"
Calf Skins, each		3 0	6 0	each.
Horse Hides		6 0	0 0	"
Polled Sheep		5 10	4 6	"
Half bred		3 4	3 10	"
Downs		2 7	3 2	"
Lambs.		2 8	3 10	"

BARK.

Per load of 5s. cwt.

English, Tree ..	£13 0 0	to	£14 0 0
Coppice..	14 0 0	to	16 0 0

FLAX.

BELFAST, (Friday last.)—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

OILS.

Linseed, 32s. per cwt.; Rapeseed, English, refined, 37s. 6d.; do. foreign, 38s. 6d.; Gallipoli, per tun, 44l.; Spanish, 42l.; Sperm, 84l. to 86l.; do. bagged, 84l.; South Sea, 36l. to 37l.; Seal, pale, 39l.; do., coloured, 36l.; Cod, 39l.; Cocoa Nut per ton, 38l. to 40l.; Palm, 32l.

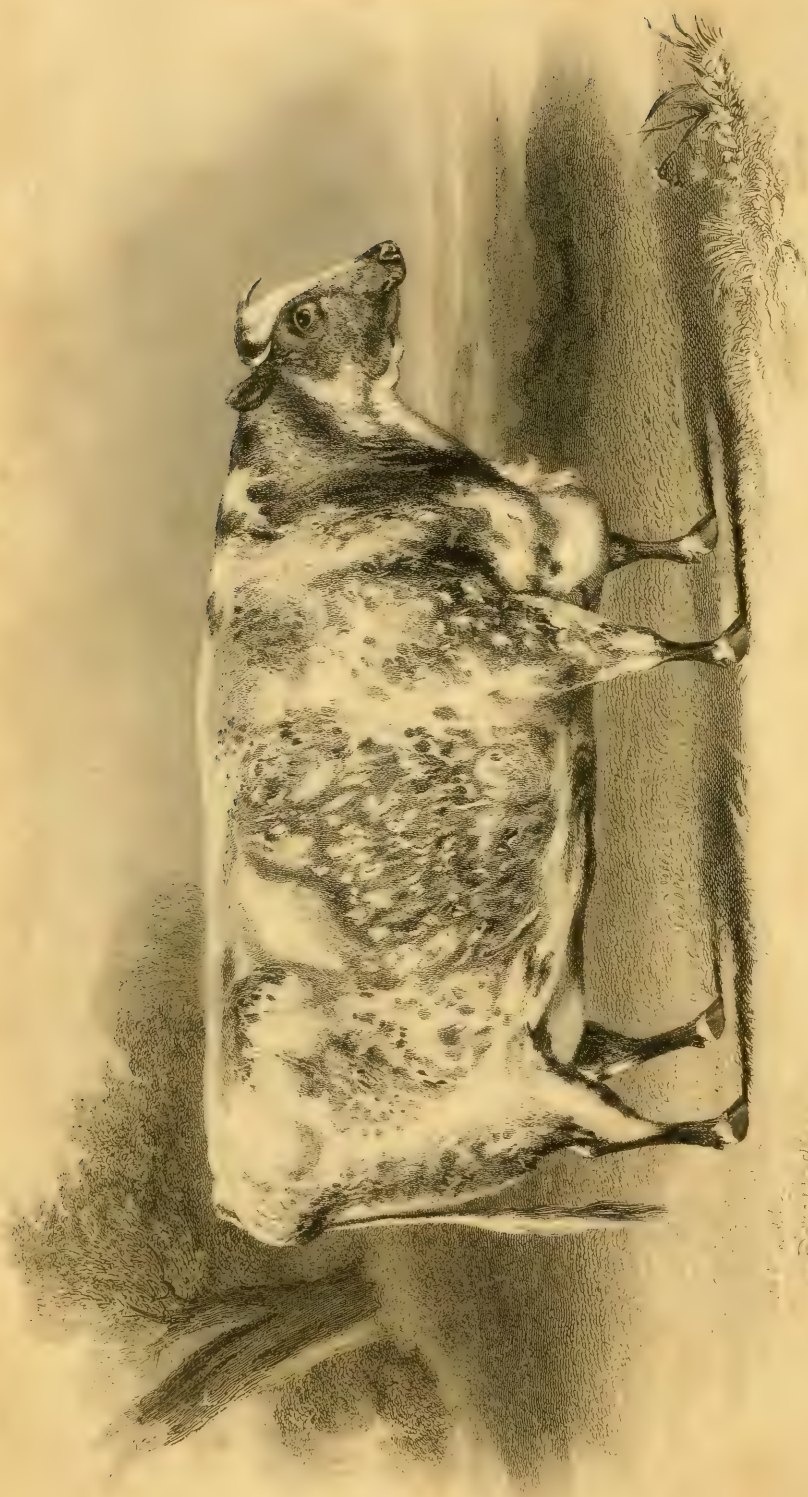
WOOL MARKETS.

LEEDS, Oct. 25.—Sales of combing and clothing wools have been moderate during the present week, and prices are firm at last week's rates.

LIVERPOOL, Oct. 26.

SCOTCH.—There is little demand for Laid Highland wool, which must either arise from the consumers of this class having freely supplied themselves at the clip time, or that it is found higher now than some other sorts as a substitute. White Highland is in fair request. Good Crossed and Cheviots are more inquired for, without leading to much business.

LEEDS, Oct. 25.—Foreign and colonial wools have both been more inquired after during the past week. Prices are well maintained.





THE FARMER'S MAGAZINE.

DECEMBER, 1850.

No. 6.—VOL. XXII.]

[SECOND SERIES.

PLATE I.

A SHORT-HORNED COW,

Bred by and the property of Mr. W. Fletcher, of Rodmanthwaite, near Mansfield; for which the first prize of £20 and the silver medal were awarded, at the Smithfield Club Cattle Show, in December, 1849.

PLATE II.

A SHORT-WOOLLED SHEEP,

The property of Mr. W. Sainsbury, of West Lavington, Wilts; for which the silver medal was awarded in extra stock, at the Smithfield Club Cattle Show, in December, 1849.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF THE ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. VIII.

It is gratifying to observe the impression that has already been made by the publication of the many experiments tending to prove the power possessed by loamy soils to absorb manures. The article at page 403 of the last number may be perused with interest, as it comprehensively alludes to the essay of Mr. Thompson, as well as to that by Professor Way. But it has scarcely given a correct view of the opinion entertained by the latter gentleman of the efficient cause of absorption; for at page 372 of the original essay we read—"It has been shown that ordinary soils possess the power of separating from solution, and of retaining for the purposes of vegetation, the bases of the different alkaline salts, and certain animal and vegetable substances; and that this power extends to *all those substances* to which we attach the chief value as *manure*. Until we are in possession of a full knowledge of the *cause* of this peculiar action, and the circumstances under which it becomes operative,

we should not be justified in insisting upon any *general application of the principles in question to agriculture*." Here we perceive caution to express a strong opinion at a time when the phenomena were in a state of incipient development; but since the end of August the learned writer has arrived at the following more definite conclusion on one material point, namely, the presence of much lime in the clear liquid which has passed through the soil—"The *original liquid* contains salts of potash, magnesia, and ammonia; these part with their *base* to the soil, and take up lime to combine with their *respective acids*" (Private letter). I do not wish to trespass far upon the boundaries of another, especially where the subject is in the hands of one possessing every appliance, and ability to employ it to the best advantage; yet, with the facts elicited during the course of the simple experiments I have been engaged in subsequent to Mr. Way's essay, I am bound to state that there are difficulties which

OLD SERIES.]

hamper the path of inquiry into *causes*, that cannot be removed by other means than the most searching analysis of every soil that is found to possess absorbent powers. For instance: we prepare or take at hap-hazard a sufficient quantity of a liquid manure to saturate a given bulk and measure of earth, and in addition to produce a certain quantity of clear colourless "filtrate." The product so named is invariably found to contain a great quantity of salts of lime, such as the sulphate (or gypsum), chloride of calcium, and the like; yet the manure employed is found to contain scarcely a trace of lime, or of any one of the acids which shall be distinctly detected in the filtrate; while also the earth that is used as a drainer contains a quantity of free carbonate of lime so small that it can with difficulty be detected by the muriatic test. Under similar circumstances—and they have come under my own observation—we must presume that lime in one form or other lies masked and concealed till educed by the agency of the manure. It ought to be understood as a principle that the soil used must be somewhat loamy, and that loams contain more or less lime. Now, it appears that a portion of the lime thus present may be so combined as to remain irresponsive to any acid test. Thus in Mr. Way's analysis of a white clay, it appeared that in the 100 parts dried at 212 deg. there were 0.55 parts of lime which could not be dissolved out by acids, while there were found only 0.27 parts that were so dissolved (see page 320 of the Report). Again, it is by no means improbable that lime may exist in a soil as gypsum (sulphate), and as a phosphate especially, if bone-dust has been occasionally introduced. In such cases no effervescence will be produced by the muriatic or nitric acid tests; therefore, in order to understand the nature of the agencies which operate the wonderful phenomena that have so recently been brought to light, the constituents of the earth and the manures employed must be determined with *quantitative* accuracy. The solution of this problem claims the attention of every agricultural chemist who is in command of every essential appliance.

In the mean time, pending inquiry into causes so vital to cultivation, the practical man in field or garden may rest assured, that there is not any species of real manure, *solid or fluid*, which he can apply in vain. The land will, in the first place, seize, and combine with, the colouring and fetid ingredients; thus fixing the humic and ammoniacal elements—facts which point to some of those mysterious attractions that appear equally new and extraordinary. And here appositely occurs to mind a conversation I once had with a cottager, who asserted that cabbages of the finest quality, tender, nicely hearted, and free of any bad flavour,

had been raised by making holes in the ground with a crowbar sloping in a direction towards the root of each plant, into which was poured a quantity of fecal matter from the privy. Each hole was understood to be about 12 to 16 inches long, and was filled with the thick *cloacine* as it was laded from the place. The practice was too repulsive to be adopted, yet it reminds one of two facts worthy of attention. It is well known that cottagers and small farmers in places remote from towns, and where there are no cesspools, throw a quantity of earth over the fecal, exposed matters—till layer above layer of the two materials fill the open receptacle: the earth absorbs and deodorizes the excretæ, and thus a very valuable mass of manure, void of foul odour, is constantly in a state of formation. Again, in country places, where there are no cesspools, deep holes are dug at a distance from the dwelling, to receive the accumulated cloacine, which is then covered over with at least two feet of earth. I have seen, after a lapse of two or three years, when one of these receptacles was opened with a view to obtain the manure, that the entire substance was converted into little better than a brown *mass of fibres*, which had been produced by the intrusion of elm-roots from hedge-row trees several yards distant. Little or no appearance of manure remained, and, as such, the whole bulk was comparatively useless. Some such facts must recur to the recollection of many persons; and now, when chemical science proves the existence and activity of absorbing and combining powers, they all should be received as practical evidences of theoretic truth.

Having been led to dwell thus on the subject of manure, I shall close this article by describing a mode of preparing a mass of artificial compost which was adopted at the Union of Maidenhead, which comprised many parishes.

An excavation—say, five yards long, two wide, and one deep—was dug: the first layer over the bottom a foot of loamy soil, upon that straw and the refuse of the garden. From time to time, a gang of the paupers was seen bucketing the urine of the work-house-tank, which the men slushed over the refuse. The ashes of every kind produced in the establishment were scattered over the heap, and then followed more mould, &c., &c., collected on the premises. As decay proceeded, the farmers and gardeners took away so much of the mixed compost as they required; and thus the manure heap was in a constant state of progression. It will be inferred from what has been discovered, that the processes of attraction and absorption would thus be carried out very advantageously, while every particle of decomposable, and combining matter was used instead of being wasted.

As a final remark. If the phenomena lately an-

nounced merit the attention of every one zealous in the cause of agriculture, we trust that our public institutions and colleges will take up the subject with energy. They possess every means of extensive research, and can ascertain the capabilities of many

varieties of soil and manure: let them be on the alert. Private individuals may render service by the development of simple general truths; but they lack the means to enter into the minutiae of analysis.

THE IRRIGATION OF SMALL PLOTS OF GRASS LAND.

BY CUTHBERT W. JOHNSON, ESQ., F.R.S.

As the importance of irrigation becomes more generally understood, several minor questions arise well worthy of even the farmer's consideration. The word "irrigation" naturally induces the cultivator to think of meadow lands lying by the banks of copious streams; or if he extends his views to the far more valuable system of sewage irrigation, he as naturally thinks of those favoured meads adjoining populous places—towns whose sewage is available in copious supplies. This, however, is taking a very limited view of the value of sewage irrigation, even on a small plot of ground to a farm. There are very many situations where the farm house is situated at such an elevation, as to admit of its sewage being carried by its own gravity on to desirable lands adapted for the formation of watered plots of grass; and although the plots which are thus watered must be of limited extent if they have to rely upon the house sewage *only*, yet where there is an available spring of water to dilute the sewage—in that case, plots of grass may be readily watered to an extent worthy of most farmers' attention; for not only is one rood of such a mead fully equal in produce to three of ordinary pasture land, but it furnishes grass for the purpose of soiling, not only early in the spring, but late in the autumn—periods when it is not procurable from any other source.

As I observed on another occasion (*Cottage Gardener*, vol. v., p. 39), the advantage of applying house sewage to grass has long been known to be very considerable. For the purpose of testing the various little points of detail which might arise when carried-on on a small scale by small landholders, I laid down the turf on a plot of grass in my garden, near Croydon, in February and March, 1850. This was only 16 yards long, and 13 yards broad. The bed, therefore, contains only about 208 square yards, and is surrounded by a raised border of turf about two inches high, to prevent the escape of the irrigating sewage; and for a similar purpose the bed is divided by two turfed ridges of about the same size into three compartments. These ridges would have been repeated crosswise, so as to divide the bed into nine com-

partments (to suit the size of our beds to the bulk of our sewage), had we not wished to avoid impeding the action of the scythe, the whole produce being intended for the soiling of a pony. Soon after the bed was formed, earthenware pipes of about two inches bore were laid down, extending from a tank constructed on some higher ground than the grass-plot, the contents of which, whenever the tank is sufficiently filled, is allowed (by the lifting of a plug) to flow on to the grass—the orifice of the pipe from whence the sewage issues being about eight or nine inches above the level of the turf. From this pipe the sewage is distributed, by means of an open wooden trough, to any part of the plot that is just cleared. Our practice has been to cut sufficient grass for two days' consumption, and then immediately the grass is removed, to direct on to the cleared space all the sewage which has accumulated since the last cutting, occasionally adding to its bulk by allowing some pump water to flow for a minute or two from the sink through the house-pipe drain into the tank. By this plan the collateral advantage has arisen that the sewer-pipe, tank, and delivery pipe, as well as the house sewage itself, by being so constantly cleansed or removed, has not time to undergo putrefaction. The plan, therefore, is carried out (generally the first thing in the morning) without any of the inmates or visitors to the house being aware that such a manuring is systematically going on. The result, in fact, shows that the noxious effluvia from sewers arises, not as a necessary result of the matter conveyed in them, but from their ill construction, and the barbarous practice of allowing the long accumulating contents of overflowing cesspools and choked drains to flow into them.

The general result of this little experiment has been such as to induce me to confidently and warmly recommend the repetition of the plan to such of my readers who are so situated that the contents of their house-tanks can be directed by its own gravity on to a conveniently placed grass-plot. The herbage produced by this mode is not only exceedingly luxuriant, but the pony and some goats we notice decidedly prefer it to either lucern

or meadow grass, produced without irrigation ; and the same remark is made by one of my neighbours, who has a field irrigated with the water of the river Wandle, which contains occasionally a notable portion of the drainage of the town of Croydon.

It is perhaps of little use (as our turf was only laid in March) to report one season's produce of grass; still, as we have kept an account of it, it may be cheering to the reader to have the account. The grass was not ready to cut the first time until May 25th, since the turf had to establish itself, and to contend with dry weather. The weight and the days of cutting were as follows—

May	25	.....	28	pounds.
"	27	.....	40	"
"	30	.....	42	"
June	1	.....	50	"
"	3	.....	60	"
"	8	.....	65	"
"	10	.....	50	"
"	12	.....	50	"
"	15	.....	50	"
Total.....				435 "

The ground was then irrigated, as I before described, only once. It began to grow again *immediately*, and kept on in spite of a very dry season, which *parched up all the surrounding* grass lands. By July 27th it was ready to cut again—the produce being evidently better than before. The days of cutting and the weight of this second crop were then—

July	27	.....	75	pounds.
"	30	.....	65	"
Aug.	1	.....	55	"
"	3	.....	40	"
"	5	.....	60	"
"	7	.....	50	"
"	8	.....	40	"
"	10	.....	75	"
Total....				460 "

The same plan was a third time carried on of cutting and irrigating; the same dry weather still attended us, and the same growth of grass took place. On the 1st of October the cutting of our third crop of grass was commenced. The produce was as follows—

October	1	.....	70	pounds.
"	5	.....	50	"
"	7	.....	50	"
"	9	.....	50	"
"	11	.....	50	"
"	14	.....	45	"
"	16	.....	45	"
"	18	.....	45	"
Total				400 pounds.

The same immediate irrigation was applied to the land, and the same rapid shooting of the grass for

the fourth time took place. The reader will remark that we have thus secured three crops, and lost the time (in February and March) sufficient for the growth of a fourth; but, omitting that from our calculations, we have mown 1,295lbs. of grass off 208 square yards of land since the turf was first laid in March, or at the rate of 13½ tons per acre. The sewer-irrigated meads of Edinburgh always produce four or five crops annually, and I see no reason why we cannot do the same in future seasons, for the soil is evidently improved as well as its produce by the irrigation. By the term house-sewage, I mean the term to comprehend the entire house drainage in its most extensive sense.

It is fortunate that we are able (in spite of the distastefulness of the enquiry) to ascertain not only the bulk of the sewage flowing from a house, but its chemical composition. Its bulk may be regarded, in the case of houses well supplied with water and waterclosets, to amount to about ten to fifteen gallons per day for each member of the establishment; and yet, notwithstanding its necessary mixture with water, it still may be very advantageously diluted with several times its bulk before it is allowed to flow on to the grass. Its composition has been recently examined by Dr. Anderson (*Trans. High. Soc.*, 1850, p. 370). This report is the more valuable because it contains the analysis of not only the sewage of a city drain at Edinburgh, but also that from a tank belonging to a public establishment. As the professor remarks, the sewage water of Edinburgh was taken from the mouth of the sewer just as it enters the irrigated meadows near Lochend. It contained a considerable quantity of solid matter in mechanical suspension, which was carefully mixed up with the water by agitation, and the whole employed for analysis. This, which was made with great care, by Mr. Hugh Taylor, gave the following results in an imperial gallon :—

	Grains.
Organic matter soluble in water	21.90
Organic matter insoluble in water	21.70
Peroxide of iron and alumina.....	2.01
Lime.....	10.50
Magnesia.....	2.00
Sulphuric acid.....	6.09
Phosphoric acid.....	6.14
Chlorine.....	12.20
Potash.....	2.89
Soda.....	13.27
Silica.....	6.50
	105.20

What is here called organic matter is the whole amount of volatile matter expelled by a red heat. It contains, however, a very large quantity of ammonia, amounting to not less than 7.7 grains in a gallon, in addition to which the organic matter con-

tained 5.93 grains of nitrogen in the form of nitrogenous compounds.

The Morningside sewage was taken from the tank at the Morningside Lunatic Asylum, in which the whole sewage water of the establishment is collected. The analysis, which was made by Mr. Rowney, includes the whole of the matter mechanically suspended in the water :—

	Grains.
Organic matter	51.77
Alumina	4.93
Protoxide of iron.....	10.34
Lime.....	11.99
Magnesia	2.85
Common salt	4.49
Soda.....	3.00
Potash	2.66
Carbonic acid	11.22
Sulphuric acid.....	3.12
Phosphoric acid	1.32
Silica	25.02
	132.71
Ammonia.....	3.18

From the result of these examinations it would appear that of the specimens examined the town water is richer in all the valuable constituents of a manure than that of Morningside. At the same time, concludes Dr. Anderson, I consider the latter as in all probability giving a *better general idea* of the value of sewage water than the former. It is easy to compare the value of sewer water with that of any other manure, by calculating how much

of it will contain the same amount of valuable matter as any quantity of the manure in question. Selecting ammonia as the most important constituent, I find by calculation that in round numbers 10,000 gallons of the Edinburgh, and 36,000 gallons of the Morningside sewage water will contain about the same weight of that substance as 100lbs. of Peruvian guano.

These results afford ample materials for the useful consideration of the owners of every farm—nay, of every rural garden. And when the citizen reads this, he too may make an enquiry, and place upon paper a few figures well worthy of his profitable consideration. Let him take the sewerage of London, *daily* amounting to more than 40,000,000 gallons—let him calculate the value of only the ammonia and phosphate of lime of each 36,000 gallons of this vast bulk to be equal to that of 1 cwt. of Peruvian guano, viz., £9 per ton. Having taken these data, let him multiply its daily value by 365, and then let such an enquirer coolly ponder over the results. It will amount in annual value, he will find on these data, to about £210,000. In making such an enquiry, too, he will probably afterwards remember, after a little reflection, that this huge mass of valuable matter is at present not only *merely wasted*, but that it is allowed to be actually injurious to mankind, by corrupting the waters of the river from whence they are supplied, and the atmosphere in which they exist.

ON THE CULTIVATION, AND ADAPTATION FOR THE PURPOSES OF FOOD, OF THE JERUSALEM ARTICHOKE.

BY M. M. M.

One after another attack is made upon the potato by the insidious and mysterious disease which appears to baffle the most careful and minute researches both of our vegetable physiologists and chemists; nor have the investigations of all put together been able to elucidate the causes of the disease, or to propound the means of its cure. Whether the blotches appear on the leaves, the stem, or the root, seems to be of small consequence; for those who prevent its attacks on the two first find that it only more fearfully visits the stored roots in the pits, and the parties who the most carefully store and preserve the tubers find that in the spring, instead of opening out a healthy lot of roots, they have decayed unseen, and they find a mass of corruption, and the profits and means of subsistence to man and animals are lost.

Year after year the root has fallen more or less in some or other extensive districts of the country,

and the confidence in the plant as a crop seems to be either partially or totally lost. The risk of the plant in the potato districts of warp land, where it is made a leading object of commerce, is so great that whole livelihoods are involved, and fortunes of capital are sacrificed, in the fruitless efforts to grow them for the market.

The objects of potato-growing are twofold: either they are produced for the purpose of sale to the consuming population, or are employed for the use and consumption of the family, according to the area planted; or, in the other case, they are grown as cattle-food in the spring, between the period when the turnips are finished and before the grass is fit to turn the cattle out upon, or they may be grown for sale with this object. The cost of potato planting is so serious, and the loss of a failure so great, that it is extremely desirable to adopt some mode of substituting for at least a part of the crop

some other root which will not be liable to the same kind or class of diseases, which will render its return uncertain and unprofitable.

The expenses of raising potatoes may be estimated at various sums, as price of seed, distance, rent, and other data by far too varying to enumerate; but the following will be an average cost:—

Rent of land, say	£1	10	0
Rates and taxes	0	7	6
Tithe	0	5	0
Five ploughings	1	10	0
Ten harrowings	0	5	0
20 tons of farm-yard manure, at 3s. per ton	3	0	0
Seed, 20 bush. at 1s. 6d.	1	10	0
Carting and spreading dung, at 1s. 6d.	1	10	0
Planting, ridge hoeing, &c.	1	0	0
	£10	17	6

Produce 200 bush. per acre, at 1s. 6d..	15	0	0
Deduct:—	£	s.	d.
Delivery	0	10	0
Marketing	0	2	0
Interest of capital	0	10	0
Getting up and sorting	0	10	0
	1	12	0
	13	8	0
	10	17	6

Profit per acre £2 10 6

The above is taken as an average, but is much below the produce in a healthy year on many farms in various parts of the kingdom; and, though the prices have of late years been much above the sum stated, this will be found to arise from the quantity per acre being much reduced, and, therefore, the basis or principle of the above calculation is not thereby affected.

In providing substitutes for the potato the first desideratum is, that it shall be so much more hardy as to resist the ordinary accidental diseases of the potato, because there is no advantage whatever in providing a substitute subject to the same accidents. There are other desiderata, however, which are equally necessary to be looked to; and these are—equal nutrition, to render it available as food for animals or both; and, secondly, to have a plant which shall, if possible, be as palatable, and its usage become as general a vegetable, as the potato.

Now, as regards *nutrition*, the Jerusalem artichoke has a remarkable similarity in its composition with the potato in 100lbs. as regards its organic elements—

	Potato.	Jerusalem Artichoke.
Carbon	44.0	43.02
Hydrogen	5.8	5.91
Oxygen	44.7	43.56
Nitrogen	1.5	1.57
Ash	4.0	5.94

Now the difference is in round numbers, thus:—
The potato has—

One per cent. more carbon,
One per cent. more oxygen.

And the Jerusalem artichoke has—

A trace more hydrogen,
A trace more nitrogen, and
Two per cent. more ash.

In other words, the potatoes contain more of the materials for respiration than the Jerusalem artichokes; whereas the latter are more abundant in the flesh-forming substances, and therefore would indicate that they are more suitable as such for breeding, and less for feeding animals.

As regards the inorganic compounds, there is also great similarity. According to Boussingault, they stand as follows:—

	Potato.	Jerusalem Artichoke.
Potash	59.95	54.67
Soda	Trace.	Trace.
Lime	2.09	2.82
Magnesia	6.28	2.21
Oxide	Trace.	—
Alumina, oxide of iron, &c.	0.59	6.39
Phosphoric acid	13.16	13.27
Sulphuric acid	8.27	2.70
Chlorine	3.14	1.97
Silica	1.52	15.97

It so happens, however, that there are great differences in the analyses of different chemists; but this is, generally speaking, pretty plain—that though difference of the two is not so very great, yet the one can be grown on soils where the other would absolutely perish, and, if anything, the Jerusalem artichoke contains positively more of some of the salts most necessary to a fertile soil. Thus, for instance, as will be seen subsequently, it contains more phosphate and more alkali than other crops like the carrot or the beet, or even the turnip; and yet it can grow and thrive where all these crops would starve, and thus a very great power of assimilation is evidently possessed by this plant, and goes so far to prove what we shall have afterward to establish—that it possesses an amount of constitutional hardihood far beyond any of our cultivated root crops.

This plant is, however, somewhat objectionable, inasmuch as it contains more water than the potato. The relative position of the two are given as follows:—

Potato	75.9 per cent. of water.
Jerusalem artichoke	79.2 ditto ditto.

Now, assuming the produce of the land to be equal in both cases, and that the weight of roots in both instances was 7 tons, we shall have $4\frac{1}{2}$ cwt. more of solid food in the potatoes per acre than in

the Jerusalem artichoke; or, in other words, it would require a produce of $4\frac{1}{2}$ cwt. per acre more of the latter for making the feeding properties of the two roots equal.

So much we have said as regards the nutriment of the root. But where food for cattle is an object there are remarkable differences between the two plants. The potato haulm is not generally very much applied to the purposes of feeding. The stems of the Jerusalem artichoke afford food which is not disrelished by cattle, is given both green and dried for fodder on the continent, and, as regards turnip-tops, is remarkable for a similarity in the elements which sustain respiration, but deficient in nitrogenous matter. They stand regularly thus—

	Turnips.	Jerusalem Artichoke.
Carbon	42.9	45.7
Hydrogen	5.5	5.4
Oxygen	42.3	45.7
Nitrogen	1.7	0.4

If the tops of turnips were taken, instead of the total root, there can be no doubt that the similarity of composition would be much more manifest; but sufficient is shown to indicate that the avidity with which they are eaten by cattle is founded on a proper instinctive appreciation of their value as food, a power evidently possessed by cattle, as their fondness for oilcake, bean-meal, &c., clearly testifies.

Not only, however, must a plant possess the necessary elements of nutrition, but it must possess them in an assimilable form. A poisonous plant, for instance, may contain chemically all the requisites of food, and yet be totally unfit for use as such; or a plant may contain ultimate elements fit enough for food in the abstract, and yet not present them in their proximate constituents in an easily assimilable form. No animal, for instance, can subsist on phosphorous nor ammonia; the plants must assimilate and eliminate these into organic and protein compounds before they can be available as food for animals. Hence given quantities of gluten, albumen, starch, sugar, gum, &c., must be available before any substance can be fit for food for animals. From analogy, the Jerusalem artichoke, from its powerful vital affinities, might be supposed to be deficient in this peculiarity; for it seldom happens that plants which possess a great amount of endurance are of the same value, as food, as those which require more care in cultivation. Analogy here would, however, we think, mislead us. Bracormot gives the following as his analysis of the proximate elements of the Jerusalem artichoke, which shows it to be useful and suitable as an article of food:

Grape sugar	14.800
Maline	3.000
Gum	1.220
Albumen	0.900
Fat	0.060
Citrate of potash	1.070
Phosphate of potash	0.060
Sulphate of potash	0.120
Phosphate of lime	0.140
Citrate of lime	0.080
Chloride of potassium	0.080
Malate of potash	0.030
Tartrate of lime	0.015
Woody fibre	1.220
Silica	0.025
Water	77.150

100.

This shows the root (for it is the tuber which Bracormot has here analyzed) is abundant in respiratory elements, and is therefore calculated for feeding grown stock—fattening, if the term is preferred—and is useful in combination especially with highly nitrogenized food as an aliment for stock. Never let it be forgotten that this is the only plant which is capable of converting a barren sandy soil, unfit for the growth of corn, turnips, or potatoes, from its barrenness and poverty into a medium of producing sugar. Only imagine that if a crop of ten tons per acre could be produced, we have at once a plant capable, with little care or cost in cultivation, of producing, as by machinery, from the wide field of nature, the quantity per acre of one ton nine hundred-weight and four stones of sugar to afford fat-forming and respiration-sustaining elements for the animals, as well as the other substances of more or less nutritive value. So abundant are they, indeed, in this element, that Payen was able to ferment their juices, and obtain from them a kind of beer. How far they might act as substitutes for beet-root in the manufacture of sugar it is not our present province to inquire; but, irrespective of their roots as food, and their leaves also, the stems and other refuse will, when decomposed, form a considerable quantity of vegetable manure; and possessing, as they do, this vast power of elimination, they are clearly pointed at as a very superior method of food-producing on poor heath soils.

USES.

As food for stock, for pigs and cattle, and, in some cases, for horses, there can be no doubt that safer, more easily cultivated, and less liable to general drawbacks on production, very efficient substitutes for the potato may be found; and even this is of some considerable consequence. It is the practice of many farmers in ordinary seasons to feed pigs for some two months on the potatoes they have grown on the farm; and not a few, especially in England, depend upon potatoes alone to feed

their cattle from the time of the turnips being consumed to the period when the pastures are fit to be broken, or embracing a period from the 6th of April to the 11th of May.

When the proportion of grass land is comparatively small it is necessary to resort to some artificial mode of providing for the cattle. Independently of the hay being an expensive manner of feeding in the spring months, because so much area of land in this particular produce is required per animal, there are many farms where it is not available; and hence some farmers resort to one kind of root-crops, and some to another; while in many cases recourse is had to artificial food. In the milder climates of the south the mangel wurzel forms a mode of filling up the vacancy between the turnips and the grasses, but which is not so easily obtained in the later or colder climates of the north. Hence, when the potatoes become scarce or the crop a failure, the pigs have to be fed exclusively on barley meal; and the cattle have had to be supported either on corn or some other equally expensive medium.

On recently reclaimed sandy land, where, owing to the almost entire absence of soil, more difficulty is generally experienced in procuring potatoes from the thinness of soil or general infertility, some very hardy plant is needed, the root of which will sustain animals in the months of spring when the crops of green food are generally late, as is the case in soils of the description above referred to. The main difficulty in obtaining substitutes for the potato is adapting them to a very thin, poor soil; because it is on such, as we have remarked, that the chief want of them occurs.

Amongst the resources of the farmer on such soils is the Jerusalem artichoke (*Helianthus tuberosus*). Twenty-five years ago the writer and his family obtained possession of several acres of very thin, sandy soil, very full of water; and, as draining was not so well understood at that time as it now is, they rather attempted to struggle against the effects of it than to get it taken away. A previous relative, who was a great experimentalist, had planted a part of it with Jerusalem artichoke, and we continued its cultivation until the soil was deepened and drained, when the cultivation was given up, and that of turnips and potatoes carried more fully out.

The artichoke had been planted a year before the land came into our possession; and the stems resembling, most of all, those of the sunflower in the character of its leaves and stalk. And, poor as was the soil, and disadvantageous as was the culture, they were, on an average, from four to six feet high. The plough was set to work in the autumn, in the month of October, to bring the roots to the

surface; and as they had not been planted in ridges, the whole land was ploughed and the crops gathered.

The roots were about the size of an ordinary pear, and the produce about one or two tons per acre; leaving, however, a considerable quantity in the ground. The haulm on the piece was very considerable, and the leaves were readily consumed by the calves and cattle generally, who not only relished them, but also did well upon them. The tubers were afterwards disposed of in feeding the pigs; and, though no registry of their increase of weight was made, they were considered to be useful and feeding roots.

Although only the refuse tubers, and the wiry fibres by which they were attached to the stems, and notwithstanding that no manure was applied, the crop the following year was found to be as productive as the one preceding.

The whole was then ploughed up, and the land made turnips; but great difficulty was experienced for some years to rid the soil from them, for the smallest seemed disposed to grow and spread rapidly even in so poor a soil.

As to their palatableness for the use of man it is difficult to institute any standard; and until use has accustomed and habituated the taste to any particular plant, it is impossible to suit it. The same difficulty occurred in the introduction of tea—of hops, which it was alleged they would “spoil the taste of drink.” Yet it would be now almost impossible to dispense with the use of either.

Nor can it be expected that at first the taste can become so accommodated to the Jerusalem artichoke as to relish it until custom has reconciled us to its consumption.

As an occasional substitute for the potato with meal, and with or without other vegetables, it is to most persons an agreeable vegetable; but custom alone would reconcile it, as it must do by degrees, to its entire employment. Still a partial discontinuance of the cultivation of a risking plant is an object of great national interest, if it can be even partially dispensed with.

As a partial substitute it offers facilities far beyond the carrot and the turnip, which can only be used to boiled meats; or the best, which can only be considered as a salad. And perhaps it more nearly resembles the potato in appearance and taste than any other cultivated vegetable.

CULTIVATION, STORING, AND PRODUCE.

It has been said that there is scarcely any situation, how poor and unfavourable soever to vegetable growth generally, which will not produce more or less of the plant; though, of course, its *return* is proportioned to the pains bestowed on its culti-

vation. And, when once introduced, the vital power and energy of the plant seems so to obtain dominion over the soil that there is more absolute difficulty in eradicating than in cultivating it. And such is the accumulative power of the plant that it can, from soils too sterile to grow other crops, abstract the locked-up mineral matter which the vital energy of the others cannot. And the leaves seem to have equal constitutional power, for they will grow, and comparatively thrive, in shades and aspects where other plants would perish.

Several parties who have cultivated the plant have furnished the writer with the results of their experience, and, as they contain valuable practical hints, they are appended below.

"1. They will grow in any soil; but to grow them to perfection they require a good, rich soil, and plenty of manure. I never fail having a good crop; and the system I adopt is this: after having ground well trenched and manured, about the end of March I plant them in lines four feet apart, eighteen inches in the line, and from four to five inches deep. I plant the sets whole, unless they are very large, then I have them cut in the same way we do potatoes; they require nothing more after planting but to be kept free from weeds. Towards the end of September I have the tops cut off two feet from the ground, but the roots remain until the middle of November, when they are taken up and stored away in the usual way we do potatoes, either in pits or a dry shade, where they will keep well until the following May. Our lines here this season were twenty yards long, and from each of these we had three bushels of good artichokes."

"2. The Jerusalem artichoke—or *Helianthus tuberosus*, in botanical parlance—is a plant which has been driven out of cultivation, comparatively speaking, both in this country and in France, by the introduction of the potato. To myself it is a most agreeable diet when taken instead of, or in conjunction with, potatoes and animal food. The culture of this plant is of the simplest kind, as the same treatment which is generally given to the potato answers for the production of the Jerusalem artichoke; and, like the potato, the produce varies according to soil, aspect of the situation where grown, and other general treatment as to hoeing, weeding, &c. The deeper the soil is dug or trenched the richer it is, and the better the crop. But here, again, as is the case with the potato, where the soil is over-manured the tubers are large and hollow, and of various shapes, and not so palatable; therefore a medium quality of soil and a good aspect produce the most serviceable tubers. As to the amount of produce per acre I cannot say confidently, but I judged my crop in 1846 was at the rate of 500 bushels per acre. It was not from

any particular treatment; but, as the summer was hot and the aspect was east, there was sufficient moisture to supply the natural wants of the plant. I have only cultivated this plant between the parallels of York and London, and therefore cannot speak to its productiveness north of York. I never saw the plant open its flowers, though I have several times seen the flower-buds of considerable size. Its name is said to be a corruption of its Italian name, *Girasole* into *Jerusalem*, and artichoke from the flavour of the roots, which is very much the same as the globe artichoke.

"3. I send you my experience of its growth, and there is one important fact that I think should not be lost sight of in growing them for profit; that is, the stems when taken up, the roots being taken off, may be planted again, for there are a great many buds at the bottom which grow again, and thus a good crop obtained, if not better than from the roots themselves; so that any person growing them this year can have all the produce for use, and have a crop as good next year from the stem. But when they come up, if too many shoots appear, they require to be thinned, as they often produce six or eight together; and I think two or three are quite plenty from which to expect a crop, for I find they must have plenty of room or the return will be small, both in size and weight. As to the storing of them, unless the ground be wanted, I should not take them up until planting time, which should be as soon after the new year as possible; and the remainder should be put away in sand, as they are apt to heat if put up like potatoes, so much so that I have seen them smoking, and quite rotten in a short time. And when planted from the roots, they can be cut the same as potatoes, and only require one eye to each set; but if grown for the roots the leaves should not be taken off, as they always lessen the crop."

GENERAL RESULTS.

As a healthy, nutritious, and palatable food, cultivated with little trouble, easily obtained, preserved with facility, and being well adapted as subsidiary to rather than exclusive of the potato, it may be safely recommended.

To the cottage and small-allotment tenant it will form a most valuable auxiliary; will make the poorest parts of his grounds very productive in roots and green fodder, and will fill up an hiatus in any of his cultivated crops which it would be difficult to find any other crop to do.

Our usual mode of eating the artichoke was with salt alone to our usual animal food, and no sauce whatever was used with it.

The mode of cultivation is very easy indeed, and but few mistakes can take place, as it will grow in any light soil and in any aspect. The seeds do not

appear to be at all developed in this country, and the propagation is by the tubers; or, if kept in the earth, the fibres alone are necessary to propagate the plant. The best mode of planting is to put the small tubers in the earth, and with a little ordinary manure. The leaves may be stripped from the stems, cut in August, and given to the cattle. The roots may either then be harvested and stored away in houses or sheds under straw, and taken out as they may be wanted; or they may be pitted the same way as potatoes; they may also remain in the earth until wanted, as the frosts of winter seem to have as little influence in producing any injury to them as the droughts of summer.

Indeed, they are, for all purposes, the hardiest vegetable with which we are acquainted. They may be grown on ordinary soils; and when kept clean, may be cultivated for two years in succession without any manure; the second year, with a very small application of manure, the crop may be grown for many years on the same piece of ground.

The main objection to the Jerusalem artichoke is its being of a watery character; but this is more ideal than real; for though it certainly contains a larger proportion of water than the potato, still, it contains much less than the turnip, which is much used as an auxiliary to the potato in the winter months; and the fact that the artichoke can be cultivated in soils the very reverse of those on which the turnip or potato is grown, and the greater freedom from disease, and less liable to injury, plainly indicate that they are a very legitimate auxiliary to the potato. In summer, for instance, it is a very cooling and refreshing aliment, and in the severest winters will be found to resist a frost before which potatoes will perish. They may also be safely left on the ground if the autumn should be found unfavourable to taking them up, and at the proper season they may remain in the earth and taken up only as wanted.

We think, on the whole, that in these times of great uncertainty as to safe cultivation—at least for some time to come,—the use of the Jerusalem artichoke ought to be encouraged, especially on the poor sandy soils, where the cultivation of less hardy plants would be a matter of uncertainty and difficulty, if not an utter impossibility.

By a little habit, by the overcoming of some prejudices, they might be a very valuable auxiliary to the turnips as food for stock; and to a certain extent as food for the family, as a partial substitute at least for the potato.

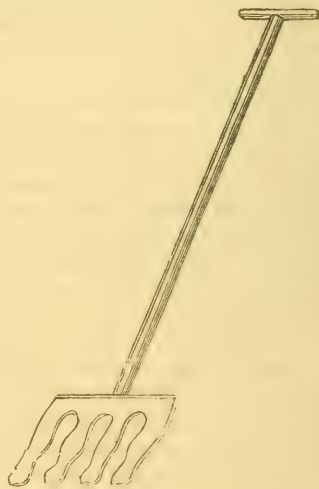
Their eradication from the soil being, as we before intimated, the real objection and difficulty, they will require more pains in extermination, where another crop is intended to follow, than may at

first sight appear; but this applies to the chicory plant, and several others, and does not deter persons from their use.

And, indeed, we do not see where the difficulty exists of growing a succession of crops of the Jerusalem artichoke on the same soil. We would venture to suggest the following plan as a trial on the poor sands of Norfolk, or on any sandy heath recently reclaimed.

Plant out the artichokes after proper cleaning, in rows twenty-seven inches apart, and manure with slightly fermented horse-dung, on which four bushels of vitriolized bones have been poured. Hoe and horse-hoe well, as long as the plants will admit of it; and thus you have attained two objects—obtained a good crop of artichokes, and oxygenized the soil between the ridges; while the leaves of the plant will, by falling and by their shade and droppings, tend to enrich the soil.

Plough-up the ridges in October, and use the four-pronged fork—or more generally called, gripe or “graipe”—so as to clean out all the roots. The accompanying sketch will convey the best idea of



the instrument. Then harrow well and scarify thinly, and a second crop will spring up in the line of the plants of the preceding year. These, if well ridged up, and hand and horse-hoed, with a slight dressing of clay, compost, rotted dung—or even peat, on which dissolved bones have been poured—will again afford a remunerative crop; remunerative because the expenses and outlay have been very little. How long a system of repeated cropping like this might be adopted, we cannot pretend to say; but it must be confessed that a more tempting source of food for stock, on light land, we hardly know; and if the tops are diligently rotted and carefully preserved, and applied to the land, they will form a source of a considerable quantity of

manure to the plants. The expense of cultivation per annum after the first year—inasmuch as there would be no seed required—would be a mere fraction. Thus:—

	Per acre.
	£ s. d.
Rent of land.....	0 7 6
Tithe and rates	0 3 0
Scarifying twice	0 6 0
Harrowing six times	0 3 0
Cleaning twice.....	0 1 6
Horse-hoeing twice	0 2 0
Hand-hoeing twice	0 4 6
Lifting	0 10 0
Manure and bones	0 19 6
	£ 2 17 0

Now, taking the produce at the low quantity of seven tons per acre, and say they are worth 30s. per ton—a very low price indeed—it will give:—

	Per acre.
	£ s. d.
Value of crop, 7 tons at £1 10s....	10 10 0
Cost of production after first year,	
as above	2 17 0
Profit	7 13 0

The profit on a potato crop, if all sound, was given at £2 10s. 6d.; showing a clear gain, on land worth only one-quarter of the money, of £5 3s. 6d. per acre.

But if seed be deducted, worth even two pounds per acre, as it must be the first year at any rate, there will still be a saving in the produce of the Jerusalem artichoke—leaving the liability of failure from season or disease out of the question—of £3 2s. 6d.; or more, by £1 per acre, than potatoes, on a far inferior description of soil. To show the comparison of this root with carrots, beet, and turnips, as regards their mineral matter, we have collected from the various experiments of Professor Way the following details, which we have arranged in a tabular form, for the convenience of reference; and it will be seen from this that the Jerusalem artichoke, as we before intimated, possesses in its composition more phosphoric acid, more potash, and more silica than any of these crops—this being due to its superior power of assimilation, rather than from any extra quantity in the soil in a free state being necessary:—

Carrot. Beet. Turnip. Jm. art.

Silica	0.24 ..	0.54 ..	0.34 ..	0.61
Phosphoric acid	1.73 ..	0.66 ..	1.77 ..	6.81
Sulphuric acid..	1.31 ..	0.65 ..	2.33 ..	1.51
Lime	1.77 ..	0.41 ..	1.76 ..	1.34
Magnesia	0.80 ..	0.43 ..	0.47 ..	0.52
Peroxide of iron	0.22 ..	0.12 ..	0.07 ..	0.18
Potash	6.79 ..	4.99 ..	6.07 ..	22.40
Soda	2.71 ..	3.02 ..	1.16 ..	—
Chlor. of sodium	1.42 ..	5.29 ..	1.49 ..	—
Chl. of potassium	— ..	— ..	— ..	1.96

It may, however, fairly be said, will not the abstraction of these materials deteriorate and injure the soil? and is not the Jerusalem artichoke, after all, one of those exhausting crops which it is unadvisable to cultivate? We answer: If you grow it on rich soil you will be blameable, and repent perhaps the step, for it is doubtless an exhausting crop; but if you grow it on a poor sand, which will hardly grow anything else, if by that you are enabled to keep an additional quantity of stock, and if you so increase your manure, growing a certain produce at a small cost, where is the loss? For all agricultural purposes the soil was as bad as possible: from the air mainly it produces, through the medium of the Jerusalem artichoke, one ton per acre of respiration-sustaining and fat-forming materials; and if this be accomplished, may we not afford the complaint of the deterioration, especially of that which before was agriculturally worthless, if we can hereby keep our stock and increase our manure by a safe, inexpensive, and hardy crop? We think the question too plain to admit of any dispute whatever.

Into the question of ploughing-in the tops for manure as a green crop it is not our intention to enter; but if it ever be useful to make one plant the source of food to another, by using one whose constitutional power of assimilation is great, to make way for one that possesses this power in a smaller degree, and if such an object be sought on light sandy soil, we see no reason whatever why these should not be grown in one place and carried to another; for the tenacity of life and difficulty of extermination will operate against the entire plant being used in the locality where it is wanted. We know of no experiments on the subject; but we can scarcely conceive anything more rational than the success of the experiment, and if tried on a small scale it might be a suggestion of real practical value.

If the tops be cut in August or September, and carted to a heap, a very powerful and rapid fermentation will take place; and if, upon this, dissolved bones in the liquid state is poured, the residue will become a very favourable manure for the artichokes, if allowed to grow in the mode we before described, as is the case in Alsace—i. e., without change or rotation—so that the ordinary resources of the farm may not be interfered with.

Should the crop grow thin after some years, by the accidental taking up of the roots of some entire patches, and the whole seed goes, a crop of rape or mustard might be sown with some drilled hand manure, and consumed on the land with sheep, for one year, and then the whole land be broken up and dragged, and the artichokes will grow up the following year: but the benefit of the drill system

will be lost. To renew in the year following the ridge system, it will be necessary to trench plough, so as to throw the soil into ridges of great dimensions. As the year advances, the harrow, or the potato harrow, will reduce the dimensions of these, and the artichokes will again appear in rows; with the exception of a few which may be accidentally left in the subsoil, and which the subsequent horse-hoings will merely treat as weeds.

Altogether, by far too little attention is paid to this valuable and useful root by parties who have soils of a suitable character, and where the cultivation of any other crop is difficult or doubtful.

That on such soils it must be an invaluable auxiliary to the cultivator, there can be no doubt whatever, and its trial should be commenced without hesitation.

Sowerby, Oct. 10, 1850.

CHEMISTRY APPLIED TO AGRICULTURE—DR. ANDERSON.

BY A FARMER.

The peculiarity of Dr. Anderson's style of treating questions connected with agriculture is, that he is the first and only one, of the numerous writers which have passed under our notice, who admits that he has anything to learn from practical men. This peculiarity is the more striking as it is the very antipodes of the opinions expressed by more than one of his predecessors. As remarked in a previous paper, the writers on agricultural chemistry were prepared with an answer to *every* question proposed to them; they knew the value of a manure, or of a hitherto untried article of food, whether for man or beast; they knew, by the aid of analysis, what a soil required to make it fertile for sugar-cane or cabbage, potatoes or palm-trees—no matter whether the soil examined might be from Demerara or Greenland. As the very reverse to such ignorant presumption—for we can call it nothing else—Dr. Anderson, in his lecture delivered at Glasgow, acknowledges that he has “questions constantly presented to him, on which he possesses no information at all.” In the present days of quacks and quackery in matters bearing on agricultural chemistry, when the agricultural world is in a state of nervous anxiety for information, bold indeed must that man be who makes such an acknowledgment. It is a more cutting reproof to those who thought they had a “solution in their laboratory to every question proposed to them” than we dared to administer. Nor does Dr. Anderson think we shall ever arrive at an answer to these “questions” by the maiden efforts of science. No, “we must depend for their solution on the mutual aid of science and practice; the two must go together.”

A correspondent of the *Times* criticises this address very severely, and complains that it contains nothing new. We uphold, on the contrary, that it is entirely new, but more especially in modesty. By the way, we are at a loss to know why the *Times* should have been selected as the medium for criticising Dr. Anderson's lecture, instead of any of the

numerous papers and magazines exclusively devoted to agricultural subjects.

Whether such an avowal be complimentary to Dr. Anderson or not, we confess to have derived great pleasure from this lecture, containing, as it does, a clear summary of the views we have in this series of papers endeavoured to maintain. We have, therefore, nothing to criticise or find fault with, but gladly embrace the opportunity thus afforded to gather up the scattered fragments of good sense we have met with in the course of our labours.

The object of the lecture is to explain the principles of manure; or, in other words, why they act beneficially, and how we can improve them.

When any plant is burnt, a large portion of it disappears, and the residue is called the *ash* of the plant. With regard to the first of these two portions, namely, that which disappears in the fire, or as they are commonly called, the *organic constituents*, we have a two-fold source from which they may be derived. “The plant may, and in some instances does, obtain the whole of its organic constituents from the air, but this is far from being the only source from which it obtains them; for in all soils there is found a large quantity of *organic matter*, containing the whole of the organic elements (carbon, oxygen, hydrogen, and nitrogen) in such a condition as admits of their passing into a state in which they may be assimilated by the plant.” It will be observed that Dr. Anderson does not enter into a discussion on the merits of the theory proposed by Johnston, that plants extract their nourishment from the soil as *humic*, *crenic*, *apocrenic*, *glic*, and *ulmic* acids, or in the form of *ulmin* and *humins*. Nor does he discuss the opinion of Liebig, that plants are fed by the carbonic acid of the atmosphere. “Some of the facts of the case have been determined in the laboratory;” but as long as science and practice work separately, the only result has been mere speculations like the

above, of which science has supplied "one set, and practice the other." Dr. Anderson has contented himself with stating the fact that the organic matter present in the soil is useful to vegetation, as proved by its removal by certain crops: how it acts is one of the matters on which we require further information.

With regard to the *ash*, or inorganic portion of the plant, Dr. Anderson states that "every fertile soil must contain all the constituents of the plants which grow upon it, and that, too, in a sufficient quantity to supply many successive crops." But the mere presence of these substances does not ensure the fertility of the soil: it is necessary that the state of combination in which they exist be such as admits of their becoming readily available for the growth of the plant. In the first place, they must be presented to it in a soluble condition. At the same time they must not be too readily soluble, or the rains would soon carry off the valuable matter. In soils, and what we may call natural manures, as the dung of animals, this risk is avoided by the arrangement that the ingredients required by the plants are, in the soil and in fresh dung, in the state of insoluble compounds, which are only rendered available to vegetation by very slow decomposition. The whole principle of agriculture, says Dr. Anderson, is to obtain by proper management, from a given surface of land, a greater amount of vegetation than it is capable of yielding in a state of nature. This is effected by two methods: the first is by tillage, which by breaking up the land and exposing it to the atmosphere facilitates the decomposition of the insoluble matters in the soil, and renders them available to vegetation: the other method of increasing the fertility of the soil is by supplying to it those substances which the plant requires,—in other words, by the use of manures.

Dr. Anderson gives as his opinion that a fertile soil must contain all that the plant requires: so a good manure, or one which is to be generally useful, must also contain "all the substances requisite to vegetation," that is, those which are present in the *ash*. In the course of these papers we have occasionally had to dispute the extravagant estimates which some writers have formed of the value of a single substance as a manure. For instance, a French chemist asserted that the value of a manure might be calculated by the amount of nitrogen it contained; others again have lauded the phosphates, and alleged that with a plentiful supply of them the plant required nothing more. Dr. Anderson's opinion, as above quoted, and in which we cordially agree, strikes at the root of such crude opinions. He arranges the ingredients of a good manure, as regards their comparative value, as

follows:—first, ammonia; next, phosphoric acid; and then potash.

Those substances—as nitre, the salts of ammonia, superphosphate of lime, and some others—which are capable of supplying separately only one of these three important ingredients, can only be "advantageously used in those cases where the soil is deficient in the single ingredient they contain." As such instances are, however, very rare, the safest plan the farmer can pursue is to use those manures which contain all the substances required by vegetation. The first of these is farm-yard manure, which must always be the farmer's mainstay; everything else ought only to be considered as an assistant to it. Farm-yard manure will always contain more or less of the ingredients present in our crops; whereas, the artificial manures, as commonly applied, will only contain one or two of them: their chief advantage being that they contain the valuable constituents in a "more concentrated form, more free from foreign and worthless ingredients, and consequently in a state in which they may be carried to the farm at less cost than the deficiency could be supplied by bringing farm-yard manure from a distance." It is these properties which constitute the chief value of artificial manures, and when they are used along with a portion of farm-yard manure, the farmer by this combination secures the best possible mixture for his crops.

Dr. Anderson acknowledges that we are as yet unable to decide as to the best method of managing farm-yard manure. By too much fermentation the risk of losing the ammonia is greatly enhanced, and by too little the inorganic matter remains insoluble, and consequently unfit for immediate use. The application of small quantities of gypsum remedies the former evil, and the latter the farmer has to some extent under his own control.

There are several other disputed points on which Dr. Anderson treats in the lecture in a very clear, intelligible manner, removing the prejudices with which some manuring substances are viewed, and correcting the artificial value some of them have obtained. Amongst others, he shows that bones in their natural state are richer as manure than boiled bones, and much more likely to be useful than burnt bones—some practical men being disposed to estimate the latter as highly as either of the other kinds. Dr. Anderson justly considers guano to be the best of all these artificial manures, because it combines in itself, to some extent, all qualifications which have been assigned to a good manure. It contains ammonia, phosphoric acid, and potash or soda.

Such is a brief summary of the views advocated by Dr. Anderson; and however they may have suffered in our hands, in the lecture they are explained with clearness and delivered with modesty.

REMARKS ON THE ADVANTAGES OF THE EAST LOTHIAN SYSTEM OF FARMING.

We have now before us a very interesting pamphlet, entitled "*Remarks on the advantages of the East Lothian system of Farming, as compared with the system commonly pursued in the vicinity of Swansea; addressed to the Members of the Swansea Farmers' Club, by the President, C. R. M. Talbot, Esq., M.P.*" Impressed with a conviction that the system of Welsh farming pursued in his own neighbourhood was extremely defective, Mr. Talbot determined upon instituting a comparison between the Welsh system and that pursued in East Lothian. Penrice Castle farm, upon which the experiment was made, contains 250 acres of arable land, and 130 of permanent pasture; in the whole, 380 acres. When prices were high, this farm was let for £240 per annum; but latterly the rent had been reduced to £200 per annum. This farm was cultivated on the Welsh system from the year 1839 to the year 1843, a period of five years; and upon the East Lothian system from 1843 to 1848, a second period of five years. The following table shows the quantity of stock kept upon the farm in each of the periods referred to:—

Year.	Cattle of all ages.	Sheep of all ages.	Horses.	Total value.
	£	£	£	£
1818	55—331	396— 340	4— 50	721
1839	47—310	365— 350	14—125	785
1840	53—348	350— 335	15—130	813
1843	51—343	390— 381	9— 94	818
1844	61—370	492— 437	14—143	940
1845	66—590	450— 551	11—196	1337
1846	59—604	690—1014	11—229	1842
1847	66—673	782—1300	12—286	2259
1848	70—559	682—1077	13—293	1929

From this it will be seen that the quantity of stock kept was greatly increased under the Lothian system as compared with the Welsh system.

As a necessary consequence, the increase of stock led to an increase in the quantity of grain produced, a comparative statement of which is given in the subjoined table:—

	Average of ten years, old system.					New System.			
	1845.		1846.		1847.		1848.		
	bushels.	bush.	bush.	bush.	bush.	bush.	bush.	bush.	
Wheat	374	497	867	986	969				
Barley	625	392	1037	991	1316				
Oats	275	1250	1936	2122	2011				
Total of all sorts of grain	1274	2139	3840	4099	4296				

The first question which naturally presents itself to

the practical farmer, in reference to this vast increase of produce, is, What has been the cost? Upon this point Mr. Talbot shall speak for himself; he says—

"The altered system of farming is not simply a benefit to the farmer, but to the whole district in which he may be situated. Provided always, however, that these results can be shown to be attainable without loss to the pocket of the farmer: for, unless this can be done, the mere production of increased quantities would demonstrate no actual facts of practical usefulness to the tenant-farmer."

And here we must do Mr. Talbot the justice to state, that there is a manifest spirit of truthfulness pervading the whole pamphlet—an earnest desire to adhere to facts, and to state the case as it really is, without any reference to what may be the result, whether favourable or unfavourable to the new system which it is to be presumed would be regarded by him with the highest favour.

Mr. Talbot then says:—

"An account of the actual receipts and payments upon Penrice Castle farm, during four years of each system, is therefore here subjoined; and I request the reader to observe that there is nothing assumed, nothing estimated, nothing fabricated about it, but that it is a simple statement of the cash transactions upon the farm, omitting, for the sake of not confusing the subject with matters not relevant to the issue, any allusion to rent, bailiff's salary, or interest of capital employed, which latter question I will advert to subsequently."

The following is the account alluded to:—

Receipts.	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848
	£	£	£	£	£	£	£	£	£	£
Corn.....	391	258	179	224	150	188	219	603	647	575
Cattle.....	131	172	162	17	117	55	402	573	466	698
Sheep and Pigs	269	216	176	201	126	195	346	771	334	732
Supplies to Penrice-house & Stables.....	265	340	252	176	289	208	145	286	263	250
Small Sundries	36	65	124	32	35	16	70	42	48	58
Total	1095	1051	893	650	667	612	1182	2275	1758	2273
Expenditure.	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848
	£	£	£	£	£	£	£	£	£	£
Labour of all kinds	459	407	455	489	391	445	453	532	525	455
Blacksmith and Carpenter	39	44	40	63	32	41	51	75	43	50
Implements & Tradesmen's bills	50	77	19	53	85	68	26	120	35	38
Rates & Taxes	21	15	35	32	33	37	38	46	39	52
Seeds, Food, &c.	79	117	68	101	70	151	29	58	118	82
Purchases of Stock	77	190	59	100	73	..	324	767	371	275
Sundries	6	15	10	14	..	52	30	67	141	121
Horses	..	..	..	..	..	78	..	33	75	20
Total	731	865	684	843	684	872	951	1698	1347	1093

The result of this statement is that there was a balance applicable to the payment of rent, tithes, and interest of capital employed during the five

years of the old system, £349, or £110 per annum ; under the new system, £2,139, or £428 per annum.

Mr. Talbot observes that, as a difference of opinion prevails in reference to the capital per acre requisite to work the land well, he prefers giving "the actual sums advanced as capital to be invested," and which are as follows :

"1844—Allowed for stock and crop, as valued by Mr. Hancorne, of Kettle Hill.....		£1,424
1844-1845—Cash advanced the farm-manager at sundry times.....		1,090
Total occupier's capital invested....		£2,514
"Being at the rate of £6 12s. per acre."		

A valuation of the stock and crop was made annually at Christmas, from which it appears that there was an improvement between 1843 and 1848 of £1,530.

"And this notwithstanding that the valuation of 1848 was made at a time when all descriptions of farm produce were at a very low price."

Mr. Talbot then puts the following imaginary case—

"Suppose that in 1844, on the 1st January, Mr. John Jones, a tenant farmer, with a capital of £2,500 to invest, had taken this farm at the highest rent I had ever received for it, and which I have already stated was £240 per annum. Let us suppose our friend Jones to have conducted his operations eventually as they have been conducted, and to have quitted the holding at the close of 1848, thus completing five years of tenancy. His account would then stand thus—

OUT-GOINGS.		IN-COMINGS.	
1844.			
Paid producing tenant for stock and crop, as per valuation..	£1424	Received for stock and crop, as per valuation	£2954
Paid do. for customs, say	100	Do. from in-coming tenant for customs ..	300
Capital for various purposes at various times during 5 years	1090	Balance of receipt and expenditure for five years	2139
Interest on the above, say.....	400		
Five years' rent.....	1200		
Five years' tithe	250		
	£4464		£5393

Now the balance between out-goings and in-comings will stand as follows—

In-comings	£5,393
Out-goings	4,464
Profit.....	£929

Or upwards of £186 per annum, after paying himself interest upon the capital employed, making in all a profit of between 11 and 12 per cent."

So far Mr. Talbot has made out a triumphant case as to the superiority of the East Lothian over the Welsh system. Thus far the history of this experiment is brought up to the end of the year 1848. Having been read by various parties, and having attracted considerable attention, Mr. Talbot says—

"I resolved to publish it, and the more particularly because at the close of a year of very low prices (1849) I am enabled to

give the reader an opportunity of judging how far the East Lothian system is calculated to carry the farmer through these difficult times, as compared with other systems."

With this view a statement of the gross receipts and expenditure on the farm for the year 1849 is given as follows :—

"RECEIPTS."		EXPENDITURE.	
	£		£
Corn	2443	Labour of all kinds....	462
Cattle	518	Blacksmith, carpenter, &c.	42
Sheep and Pigs	486	Implements and tradesmen's bills	44
Supplies to Penrice Castle house and stables.....	288	Seeds, food, &c.	162
Small sundries	17	Purchase of stock	196
		Sundries (guano, £101) ..	123
		House.....	
Total.....	£1752	Total.....	£1072

Balance applicable to the payment of rent, tithe, and interest of capital employed, £680."

In order to render this statement satisfactory, the valuation of stock and crops at Christmas, 1849, must be referred to, and which was £2,535. Upon this Mr. Talbot observes—

"From this statement it appears that the total value of the stock and crop of this farm has decreased upwards of one thousand pounds within two years, while the number of animals and quantity of corn and roots valued does not practically differ. In point of fact, the stock of the farm is much the same, but the depreciation of the markets is represented by the sum of one thousand pounds. I commend this simple fact to the attention of those logicians who maintain that the present reduction in rent would set all things straight. And I would ask, were I a tenant (the imaginary John Jones of 1848), now relinquishing my holding, could any liberality of my landlord, in reference to his rent, compensate me for my loss of capital?"

The estimated capital on the farm was £3,669; a depreciation of £1,000 will therefore be very nearly approaching 30 per cent.

Mr. Talbot further says :—

"From the statement of balance applicable to the payment of rent, tithe, and interest of capital employed, taken together with the above valuation, conclusions may be drawn (so far as it is possible to draw conclusions from a single year's expenses) as to what chance the farmer has of contending against the probable result of permanently diminished prices. The question whether wheat can be grown at 40s. a quarter is one which is now agitating the agricultural world in all parts of these islands; and it may be as well, therefore, that I should remark that the average price paid for wheat, the produce of the farm, and sold during the year 1849, was 44s. per qr., that of barley 31s., and that of oats 24s.

"The simplest way of putting the question is to ask, What would have been the balance applicable to the payment of rent, tithe, and interest of capital during the year 1849, if the prices of agricultural produce had not fallen (say) 20 per cent. ? In that case I should have received—

For corn ..	instead of	£443 ..	£554
For cattle ..	"	650 ..	518
For sheep ..	"	607 ..	486

And altogether the receipts of the farm would have been £2,190 instead of £1,752.—Difference, £438."

We think there is another way in which the ques-

tion might be put. If the surplus of £1,752 has been obtained by selling wheat at 44s. per quarter (the *Gazette* average price for the whole year 1849 was 44s. 3d. per quarter), barley at 31s., and oats at 24s., we think a reduction must be made in these prices, which, although obtainable in some instances, are far above the average.

Mr. Talbot then observes :—

“The expenditure of the farm during 1849 ought, according to the politico-economic theory, to have exhibited a corresponding deduction of 20 per cent. But no such deduction actually took place, except on the single item, ‘purchase of stock,’ for which I must have paid, if prices had not fallen, £245, instead of £196. Having already stated what the rent was when this farm was let to a tenant-farmer, I request the reader to draw his own conclusion as to what abatement of rent would give an equivalent to the cultivator for his loss on the yearly balance as above stated. And I would beg the reader to estimate impartially what pecuniary advantage would practically ensue from the entire removal of the burdens of poor, county, police, and road rates. Having done which, I think he will agree with me that a permanent reduction in price of 20 per cent. is an evil of greater magnitude than the suggestors of remedies appear to have calculated.”

Mr. Talbot concludes his pamphlet as follows :—

“I do not pretend to assert that ‘high farming’ is an equivalent substitute for ‘protection,’ or that any sort of farming will enable the British farmer to compete with the whole world; but I believe that I can continue to cultivate the

farm with wheat at 40s., provided other produce does not undergo still further depression than the average of 1849, and provided also I remain exempt from those casualties affecting crops and stock which sometimes baffle the calculations of the most prudent and cautious. I consider, however, under these circumstances that, as a landlord, I can never expect to improve the value of the land, and, as an occupier, that I must be content to conduct a hazardous business with but a trifling chance of profit.”

We have marked the proviso in *Italics*, as having a most important bearing upon Mr. Talbot’s conclusions in reference to his ability to cultivate his farm with wheat at 40s. per qr. He has been a fortunate man, if the season and prices of 1850 have not “baffled” his “calculations.” We consider this statement of the results of an improved system of farming the most impartial, straightforward, and honest of any that has yet been submitted to the public; and we trust that for the benefit and information of the agricultural community, he will publish, as early as possible, the results of the year 1850 on Penrice Castle farm. There is one point upon which we should like a fuller explanation. It is said, “The item headed supplies to Penrice house and stables refer to sheep and oxen slaughtered for my own use, and oats and straw supplied to my stable during my residence, the whole being charged at the usual market price.” Now, we should like to know what quantity of each of these articles were supplied? and at what price?—*Mark Lane Express*.

THE WHEAT MIDGE.

At the recent meeting of the Sudbury Agricultural Society, the Rev. E. Sidney said:—These occasions should be made useful in every possible way, and therefore he had, since he had attended them, endeavoured to notice some one point of interest each time. This year in many places there had been a defective wheat crop, in examining which there had been found a shrivelling of the grain. In many instances this defect was due to a remarkable little fly, multitudes of which he had himself noticed this year in June, and even predicted the consequences. In those years when they prevail they fly about the wheat coming into blossom, from seven to nine o’clock in the evening. The insect is of a pale ochreous colour, belonging to a genus termed *cecidomyia*, which entomologists know to be rather an extensive group, but having great difference of habits. They may be made a most curious study; but at present reference can only be made to the wheat-midge, which may not only be seen in its evening flight, but may be shaken out of the corn, and wake into languid flight in the morning. The female fly has a long *ovipositor*, by which means she deposits her eggs between the valvules of the corolla of the flower; and the eggs may be viewed by a strong lens, coursing one another along like little bubbles of air. When they hatch, the larvæ feed upon the pollen, and of course the consequence is a shrivelled germen. The larvæ are enclosed in cases before they assume the chrysalis state, by which it is provided that they do not become flies too soon

in the spring, before the wheat blossoms. Providence has so ordered that their ruinous multiplication should be checked by at least three parasitic flies, called *ichneumons*, which deposit their eggs in the larvæ of the midge. Mr. Kirby put one of them, called a *platygaster*, on a sheet of white paper, with a number of larvæ, and saw its operation. These larvæ are ultimately destroyed by this circumstance. They generally enter the earth, it is supposed, to become *pupæ*; and if so, then the thresher, who throws them out from the barn with the dust, puts them into the best possible place to breed. The farmer should, therefore, carefully try to extirpate them. Now they are found in multitudes in the dust from the chaff of the wheat, and the best method will be that which most effectually collects them. Professor Henslow recommends a fine sieve, and others the simple plan of a wire gauge, attached aslant to the winnowing machine. At all events catch them, and burn them with the dust, for they are proper *rogues in grain* (laughter). Having thus detained the company he would only keep them a few minutes longer. Thanks were eminently due to those who had so ably assisted him in his own parish in his lecture-room, where he hoped to meet them again in the spring (cheers), and in this association; he therefore gave “The health of his worthy parishioner, Mr. Mumford, and Mr. Viall (whom he congratulated on his recovery), their assistant secretaries” (loud cheering).

HIGHLAND AND AGRICULTURAL SOCIETY.

THE BEST VARIETIES OF WHEAT TO SOW; QUANTITIES OF EACH; AND COMPARATIVE ADVANTAGES OF DRILLING, DIBBLING, OR SOWING BROADCAST.

The first monthly meeting of the society for the season was held in the Museum, on Wednesday, the 23rd October last, the Earl of Roseberry in the chair. The subject for discussion was, "The best varieties of Wheat to sow; quantities of each; and comparative advantages of drilling, dibbling, or sowing broadcast."

Mr. HALL MAXWELL said that his lordship, as chairman of these meetings, and most of the gentlemen present, were aware of the change which had last year taken place, under which subjects of a more practical nature were introduced by practical agriculturists. The society was much indebted to the gentlemen who so readily assisted in carrying out the views of the directors, and who so ably conducted the different discussions: and he was happy to say, in recommencing the meetings this year, that they had every prospect of meeting with even a more extended co-operation on the part of the farmers. The directors were anxious to see farmers from all districts attending the meetings; and, on this occasion, two gentlemen had consented to take part in the discussion—one from the Carse of Stirling, Mr. Patterson, Cowie; another from the Carse of Gowrie, Mr. Walker Rannie, jun., Inchyra; the latter, unfortunately, had been prevented from attending, but he had forwarded a statement of his views.

Mr. HOPE, Fentonbarns, said—It is not without some reluctance that I have undertaken the duty of commencing this discussion; but if we expect to be made wiser by hearing the experience of others, we should also be ready to communicate our own opinions. From the valuable knowledge that was elicited during the discussions of last winter, and from the admirable spirit that pervaded every meeting, I have great hopes that by a continuance of the same easy and frank exchange of our mutual sentiments, and by a comparison of the different modes of agricultural management, and the practices followed in various parts of the kingdom, that much ultimate benefit will arise, not only to ourselves as farmers, but also to the country at large. I should positively be ashamed of my order, did we not readily seize the excellent machinery for facilitating these meetings, and did we refrain from taking the use of this comfortable hall for assembling together, so kindly supplied by the directors of the Highland Society. It is true

we have almost all our local clubs for similar purposes; but here, principally through the talent of our energetic secretary, Mr. Hall Maxwell, we can upon any one given subject get gathered into one focus the knowledge and opinions of the farmers of all Scotland. Let it not then for one moment be supposed, that we, the practical men so deeply interested in agricultural improvement, can be anything but ready, one and all of us, to do our part to the best of our abilities. It is with these feelings that I appear before you. I do not profess to be a teacher; I come simply as a learner, willing to state, as clearly as I can, my opinions on the important question we are about to discuss, and expecting that every one who now hears me will be equally ready to do the same on this or any other subject, so that our original ideas may be either confirmed, modified, or swept away, as our united argument and experience may dictate. I would observe that the cultivation of wheat is not the least important branch even of Scottish agriculture. In the best arable districts wheat forms the staple crop, being the most valuable of all the cereals, and the one to which the farmer chiefly looks to obtain the means to pay his rent. This is the case throughout the Lothians, Fife, Berwickshire, and in a great part of Roxburghshire, and in the Carse of Gowrie, Falkirk, and Stirling; while even from the northern counties, such as Inverness and Ross-shire, the wheat sent to Mark-lane ranks high in the market of the metropolis of the world. These facts show that the best varieties of wheat to sow, and their cultivation, is a proposition of no slight importance. Every one must be aware that the seed which may be found most suitable for one particular soil, climate, or farm, may not be so advantageous for another; and that some varieties may be more productive in one year than in others; and also, that in making experiments betwixt different kinds, great care is necessary to do it correctly. If you sow an acre, or half-an-acre of each, much will depend upon having the land exactly the same, and also in apportioning the quantity of seed to the size of the grains, as should one of the kinds be larger than the others, you may have a fifth a fourth, or a third more plants, as the case may be; while it must not be overlooked that one variety may require, from its nature or constitution, to be more thickly or more thinly seeded than others. It

is only by repeated trials that you can discover the kind most suitable for any particular farm. And though I think it commendable to try new varieties, yet I do so only on a very small scale, as I have oftener than once known a loss of £5, and have even heard of £10 an acre, from trying a new description of seed. The bulk of the crop should always be the variety that the experience of years has decided to be most suitable for the farm, as wheats differ so much in their powers of reproduction, and also in the quality of their grain. What the farmer has solely to look to, is, the amount of money that he can obtain from an acre of land; and he will best succeed in this by combining, if he can, the greatest produce with the finest quality: neither produce nor quality must be sacrificed to the other, or exclusively looked at, but to obtain as far as possible, both is what we have to aim at. Perhaps it is expected that I should enter into a history of the cultivation of wheat from the earliest times, but when you recollect that in the account of the patriarch Jacob, given in the sacred volume, we read of "the days of the wheat harvest," you must perceive that the subject is lost in obscurity. Neither do I pretend to know whether "the 20,000 measures of wheat that Solomon gave year by year to Hiram king of Tyre, for food to his household," was white or red, bearded or smooth, woolly-eared or plain chaffed, or whether it was winter or spring sown, or equally suitable for both; for under all these divisions at least the wheat plant may be naturally arranged, and were I to attempt to give you a history of each, with their numerous sub-varieties, I would enter on a task for which I am very incompetent, besides taking up your valuable time, and, I fear, without saying much that had a practical tendency. I think it, therefore, far better to direct attention to the wheats at present sown in East Lothian, and to give as faithful a description as I can of their various peculiarities, excellences, and defects. The varieties most extensively sown are Hunter's Hopetoun, Fenton, and Red-straw White: these are all white wheats. Almost the only variety of red wheat grown to any extent is Spalding's Prolific. There are, however, a number of other kinds, both red and white, which have for a time enjoyed public favour, or which are yet new, that are cultivated on a limited scale, such as Woolly-eared, Chiddam, Pearl, Brodie's, Gregorian, Trumper's Mummy Wheat, among the white varieties; and Blood-red, Lammas-red, and Creeping Wheat, among the red kinds. The Red-chaffed White, which is a distinct variety from the Red-straw White, is coming into notice; but perhaps both are too new to the district to be classed amongst the wheats that have a permanent place in public estimation. The other wheats, such as Hickling's

Prolific and Whittington's, were as extensively sown immediately after their introduction, though speedily abandoned as worthless, but not before occasioning great loss to those who had sown them. Hunter's wheat is fully entitled to the honour of being first particularly noticed, from having been for the last half-century the favourite with the majority of farmers in the Lothians—perhaps in Scotland—though it is curious it has never made its way in England. Most of you must be aware that it was picked up on the roadside at Coldingham Moor, by the late Mr. Hunter, of Tynefield, near Dunbar, and that it was to that gentleman that it owes its name and fame. I need scarcely enter into any description of a wheat so universally known and appreciated, further than to say that it is a white wheat, though in some seasons many of the grains are very high coloured, clear and flinty, which might make those unacquainted with it imagine it was mixed with red. The straw is of moderate length, the ear medium sized, the chaff smooth and thin, but with a short, sharp awn, and that the pickles are neither too closely nor too widely set. It possesses a hardy constitution, withstands well the winter's frost, tillers freely in spring, and is as little liable to disease as any variety I am acquainted with. For more than a dozen of years it formed the standard by which I tried all other varieties; and though I have ceased to sow it for the last six years, for a reason I will soon explain to you, yet it still continues unquestionably the favourite wheat with the great majority of farmers in the Lothians. In 1832 I obtained a ten guinea premium from the East Lothian Agricultural Society, for experimenting with eight distinct varieties of wheat, Hunter's being the standard, when it was exceeded in value only by the Woolly-eared and Blood-red varieties; but on again trying these two kinds, Hunter's regained its old ground, the extra quantity of red not compensating for the difference in price; while the Woolly-eared, though the finest quality of wheat, requires for success soft land in the finest possible order, while it possesses the additional disadvantage, from the nature of its chaff, of being easily sprouted and damaged in wet harvests. Since then I have tried against Hunter's various English wheats, such as Taunton Dean, Tall Cluster, and Dwarf Cluster, Kent White, and other varieties without any distinctive name; but though they sometimes grew much finer quality the first year after they were imported, they rarely yielded so much grain, and always rapidly deteriorated. The Chiddam and Pearl wheats, though fine quality, never yielded within a quarter per acre, as compared with Hunters'. The Hopetoun wheat was propagated and brought into notice by my friend, Mr. Patrick Shirreff, formerly of Mungoeswells, now

farming in Wales; to whom the agriculturists of the kingdom are also indebted for the valuable Hopetoun oat. It was raised from a head found by the late Mr. Reid, of Drem; and what is rather singular, it was growing on the spot of ground now the site of the North British Railway Company's Station on that farm. It is a smooth chaffed white wheat, with a large head and tall stiff straw. It has a magnificent appearance when growing, and consequently sometimes disappoints sanguine growers. It has been extensively sown both in Scotland and England during the last ten years, and certainly, on the whole, does not appear to be losing favour. I have not grown it much myself, though I have occasionally sown a field of it, and at other times a part, in order to compare it with Hunter's. I never found it to exceed Hunter's in quantity or value, though it always came very closely to it in both, which is more than I can say of many other varieties. Fenton wheat was propagated by my father, from three heads grown from one root, which were accidentally found in 1835 flourishing in an old quarry situated 200 or 300 yards south from the village of West Fenton. It was growing on the top of a heap of stone rubbish, and what attracted my father's attention was the shortness and stiffness of the straw. At the time I set this down to the poverty of the soil from whence it drew its support, and I thought it neither more nor less than Hunter's wheat. Experience, however, soon showed me that it was a perfectly distinct variety. I think the heads of the Fenton wheat are larger than Hunter's, and that it comes into ear a few days earlier; the grains, also, are rather more closely set; the straw is much firmer and shorter, and with the peculiarity of being different lengths from the same stem, which causes the sheaf to be a mass of heads, from the band upwards. It should be cut when the grains are soft, otherwise the appearance of the sample is impaired; but when cut green it has the clear and flinty look characteristic of Hunter's, so that it is scarcely possible to tell the one sample from the other. I confess the quality is more easily affected by the weather than some other kinds, as when stacked damp the grain gets dull and dingy. It is, however, by far the most prolific white wheat that I ever tried, whether sown in autumn or spring. It is far from being a great crop in appearance; judging it when growing, or even after it is cut, you are apt to think little of it, and it is rarely that you feel satisfied, or that its superiority is manifested until it is put into the sacks. The weight of straw per acre is frequently as great as that of crops a foot taller. I have found from several experiments that the weight of the straw averages about one-fourth more than the weight of the grain, which is just about the ordi-

nary proportion of other kinds of wheat. What I esteem its chief qualification is its strength of straw; if it is lodged, most other kinds would be useless. It is, therefore, well adapted for high farming, which is happily now the order of the day, most farmers having discovered that if manure is dear land is still dearer, with its accompanying expenses. Six years ago I sowed a 24-acre field, one half Hunter's wheat and the other half Fenton; the difference in favour of Fenton was fully two quarters an acre, from Hunter's being completely laid. Since then I have entirely confined myself to the growing of Fenton, except an occasional acre or two of any new well-recommended variety. Had it not been that it would have looked like puffing what may be considered my own variety, I would have given you the results of some experiments in growing Fenton wheat in comparison with Hunter's and some other approved kinds. Should I have, in the judgment of any, already exposed myself to the charge of favouritism, I beg to assure them that I am quite unconscious of it; and that nobody would rejoice more than myself were any new variety to be found that would supersede, for general cultivation, all those at present known. In fact, I think that this is not only possible but highly probable. I expect that this discussion will direct attention so strongly to the subject, that by-and-bye, either from the selection of a fine head, or the systematic hybridizing of known varieties, the largest produce and the finest quality may be ultimately found united. When it is a well-known fact that in four or five years at most, the produce of a single head may be increased sufficiently to sow fully 100 acres, it is astonishing that this means of increasing the value of our crops has been so much neglected. I cannot conclude my notice of the wheats I have found most suitable without again alluding to Spalding's Red, which was introduced into Scotland some years ago from Norfolk. I ought to mention that it is the only variety of wheat that in my experience has beat Fenton in quantity, though the money value per acre was rather in favour of the latter. On the whole, then, I have no hesitation in commending for general cultivation on ordinary soils, Hunter's, Hopetoun, Fenton for white wheats, and Spalding's Red as the best red I know. With regard to the proper quantity of seed to sow, this depends so much on the quality and condition of the land, even on the size of the grains and the manner of depositing the seed, and, above all, on the period at which it is sown, that it is in my humble opinion nothing less than absurd to attempt to fix any general rule. I may state, however, my own practice. When the land is fine and dry I drill from eight to nine pecks the Scotch acre, up to about the 20th of this month;

after that I increase it to ten pecks, and if sown in December to about eleven. In spring I sow as nearly as possible twelve pecks or three bushels per Scotch acre. I am unable to say anything satisfactory regarding dibbling, never having tried it but on a very small scale, and then with very indifferent success, perhaps from my want of knowledge. I drill the greater part of my grain. Last year I had about 250 Scotch acres in white crop, of which 40 acres were sown with the machine broadcast, and upwards of 200 acres were drilled. I drill on purpose to get rid of annuals, and also to check that pest of my neighbourhood—wild oats. Hitherto, I have usually hand-hoed the whole of it, and I have often seen in spring, when part only of a field was hoed, that in a few days it assumed a darker and more growing appearance than the piece that was still to do; and once, when the field was rather long in being finished, the earliest hoed maintained its superiority till the last. I know that it is said a turn of the harrows will have the same effect on broadcast wheat. I have even seen very thin wheat beneficially harrowed, in order to make it thrive; but this merely shows the benefit of stirring the surface. And surely the hoe can be applied with greater precision and effect to a drilled crop than a pair of harrows to one sown broadcast. I do not think that it matters much to the yield of the crop whether you drill or sow broadcast, unless you also hoe; and I have no doubt but that sometimes when there is an abundance of plants a turn of the harrows might be equally beneficial to both. I do not count much on the saving of seed by drilling, as the broadcast sowing machine now in universal use deposits the seed as evenly and correctly as the best drills. Some weeks ago I ordered one of Garret's drills, and his horse-hoe to suit. The cup principle being, in my estimation, much superior to the plan of the Scotch drills; and the driver having a far greater command over the implement, the work will be better done, and the horse hoe used with greater freedom. In this machine (but it is the only one) the Scotch have, in my humble opinion, sacrificed correctness of principle and efficiency of execution to a miserable economy. I would conclude by remarking that it has been supposed, from wheat being the most valuable of our cultivated grains, that therefore it was the most exhausting to the land. So far as my experience goes, I am inclined to think this supposition erroneous. Wheat is much longer on the ground, and consequently must draw more of its support from the atmosphere than the other crops. At all events, I find that I have always better crops after wheat than after barley; and why eight or ten quarters of oats should not exhaust an acre of land more than four or five quarters of wheat, I cannot understand. If I am

correct, you must see the absurdity of clauses in leases restricting the number of acres that shall be under wheat. It is essentially a condition that the landlord imposes upon himself to receive a less rent than he might otherwise do. It is true these clauses are generally intended to operate only during the last years of a lease, and it may be inferred that they only injure the farmer; but whatever impairs his pocket speedily tells on that of the landlord.

MR. PATTERSON, Cowie, Stirling, said: The part assigned to me in this meeting is to read a brief statement of the experience and practice of the district of the Carse of Stirling, on the subject of this day's discussion. Allow me, however, previous to entering on the various topics included in that subject, to premise that the soil of the district referred to is a stiff alluvial clay; that the general preparation for wheat has been, and still is, a bare summer fallow; that although turnips are grown on every farm, and on some farms over the whole extent of their fallow brake, yet the proportion is so small, that it forms the exception, and bare fallow the rule, and to which soil, under such treatment, my remarks will apply. 1st, To the best varieties of wheat, &c. In arriving at a proper conclusion as to the best varieties of wheat to sow, reference must be had to soil, climate, and market; for that must be the best, which, on an average of seasons, and in the present state of the culture of the soil, will produce a full crop, a fair sample, and command a good price—on the one hand giving plenty of straw, but not in excess, and ripening in sufficient time to escape, in a great measure, the vicissitudes of the season; and, on the other, such as will readily take the market. A good many years ago, before the Carse were drained, a yellow mixed wheat was generally sown, which gave a good crop in the then state of the soil, and was a great favourite with the bakers, it being a good baking wheat, and a large quantity could be used by itself in baking; it is, however, now lost sight of. Whether from being too often re-sown on the same soil without change, or from the land being newly drained giving an excess of straw, or from both causes combined, certain it is that during the first course of fallow after draining it got soft in the straw, lodged, in most instances producing a small crop of inferior quality, and consequently got out of favour. Since the soil has been dried, we can grow finer and more prolific wheats, and foreign being more accessible for mixing, we have a better demand for those kinds which produce a larger quantity of flour. Among the many varieties lately introduced the following four claim special notice, as having stood the test longest, and been most extensively sown in the district, viz., Hunter's, Hopetoun, Red-chaffed White,

and Oxford Prize; each possessing its own peculiar characteristics, receiving attention in proportion as the soils on which they are to be sown are fitted for their culture. Hunter's is a long-strawed wheat, and on rich soils somewhat apt to lodge; the sample is of a fine flinty staple, and much valued by the baker. Hopetoun is also a long strawed wheat, yields fully better than Hunter's, but the grain is of a softer staple, and more subject to disease while growing. Red-chaffed white is a short strawed wheat, grows generally a full crop, yields well, and requires to be cut green as it sheds readily, the sample is very fine, and is also in much request among bakers. Oxford Prize is a short strawed woolly-eared wheat, yields largely, but in damp seasons is particularly liable to be damaged by the weather. These then constitute the principal varieties grown, but the greatest demand in the Stirling market of late has been for Hunter's and Red-chaff, both by bakers and growers; which warrants the inference that they are the best varieties to cultivate in the district, and if there is any difference it is in favour of the Red-chaffed. 2. Quantities to sow.—The quantity sown is from 8 to 12 pecks per Scotch acre. Our sowing season extends from the last week in September till the middle of November; and in proportion as the sowing is early, and the soil in good condition, we give the lesser quantity—or later and damp, we give the greater quantity; if at any time we pass the middle of November, 14 or 15 pecks are sown, as the case may be; and when wheat is sown after green crops, 2 or 3 pecks more seed is allowed than after fallow—seldom, however, exceeding 16. 3. As to the comparative advantages of drilling, dibbling, and sowing broadcast.—The dibbling of wheat has never been practised in this district, so far as I am aware. A mode of drilling was introduced by the late Mr. Murray, of Polmaise, and practised by him the few last years of his life. He attached a seed-box to the common plough, and ploughed the seed in, in rows, in every furrow—covering to the depth of 3 inches, or thereby—the particular results of which I have not been able to ascertain. In October, 1843, I had prepared, for wheat-sowing, a piece of land which had grown a crop of beans; wet weather set in before it was sown, and I did not get on it again until December; part of the seed was then drilled in on Mr. Murray's plan, and the rest ribbed; but I could perceive no difference in the crop between the two modes of sowing. I did not follow the drilling farther, as it was attended with additional trouble and expense; this expense, however, may be lessened by using drill-sowing machines, and I have the satisfaction to learn that such a machine has been introduced into the district through the Messrs. Drummond, of the Agricultural Museum, and which

has been in operation this week on the farm of Steuarthall, in the neighbourhood of Stirling, in the presence of several practical farmers and others interested in agriculture, who were highly satisfied with its work. The common practice is to make up the land four or five weeks previous to sowing, then sow broadcast and harrow. The mode of preparing land for wheat which prevailed at one time, was to give farm-yard manure to the fallow, with or without lime. Since the introduction of draining, this has been abandoned, as the crop after such treatment ran too much to straw. One thing, however, has followed, and which has been the principal difficulty we have had to contend with in the cultivation of wheat; that where the land has been well fallowed, heavily limed, and not consolidated by wet or otherwise, previous to, or immediately after sowing, the plants are apt to die out during winter, particularly on the more easy soils. Various expedients have been resorted to, to obviate this, and with varied success; the seed has been sown broadcast, and then ploughed in with a light furrow; it has been grubbed in with a heavy grubber; but neither of the plans has fully succeeded; the substitution of turnip for bare fallow in certain cases has been approved of as producing this desired result. In the autumn of 1842, which was very dry, after making up the fallow in the usual way, the part which had been limed I ribbed from 12 to 14 inches wide, sowed broadcast, and harrowed; the other part got rape-dust instead of lime, and was then sown broadcast: the portion that was ribbed stood the winter very well, and was a good crop; the other lost the greater part of the plants, and produced very indifferently. The system I now follow is to have the land made up about the beginning of August, in such a way as it may be sown; but if the weather is suitable, I plough it again about the end of September, about 14 days before sowing, to consolidate the land, and raise a clod to protect the plants during winter. If that cannot be attained, and if I consider the land not sufficiently compressed, or not enough of cover for the seed, I rib it as before described; this plan has the advantage of affording a sufficient cover for the seed, without breaking down the clod, or reducing it to too fine a tilth by repeated harrowings, and the plants stand the winter better by having a firmer hold of the soil. The question very naturally presents itself here—Why is the drilling of cereal crops not more practised as a system? To this it may be replied that it is still deemed problematical whether or not any of the benefits which accrue to the drilling of such crops on light soils would follow on the clays, and may in a great measure have prevented its extended adoption.

Mr. SCOTT, Craiglockhart, said: In regard to

the questions submitted to the present meeting, I will offer a few observations. First, As to the best varieties of wheat to sow. These may vary in different localities. On my own farm I have tried various kinds—Hunter's, Hopetoun, Chiddam, Taunton Dean, Hicklings, Uxbridge, Talavera, Red-chaffed, Red-strawed, Fenton, Pearl, and some others—but, after repeated trials, I have found that on land in good condition for autumn sowing Fenton is most profitable, next to which probably Red-strawed. The Red-chaffed is a short-strawed wheat, which stands well up, but it is very liable to shake, and the straw breaks very much in thrashing. For spring sowing, what has succeeded best with me is a variety of Talavera, and next to it Uxbridge; but the variety of Talavera which I have this season is the greatest crop I ever reaped, of either spring or autumn sown: it was sown on the 12th of March, and reaped on the 7th of September. Secondly, As to quantity to sow per acre. I have heard various quantities recommended, from one-fifth of a bushel to four bushels per acre. I have never tried dibbling; but for drilling or sowing broadcast after green crops, I have generally found it most profitable to give what some may consider rather a liberal quantity of seed, beginning in the early part of the season—that is, the end of September or beginning of October—with two bushels, and increasing as the season advances to three bushels per imperial acre; but I have seldom seen it advisable to sow wheat in December or January; if it cannot be got in before the beginning of December, it is better to postpone the sowing till February, after which period fully three bushels per imperial acre should be allowed, as thick sowing greatly promotes the early ripening of the grain; whereas, if too thin sown, both the straw and grain will have a tendency to be coarse and inferior in quality. With regard to any advantage to be derived from drilling, I have generally found that on land which is perfectly clean fully as great a crop will be obtained from sowing broadcast as from drilling; but if the land is dirty, or subject to annual weeds, drilling is a decided advantage, by allowing the ground to be hoed in spring. With regard to dibbling, as before stated, I have had no experience; but I observe in the last number of the "Journal of Agriculture" a report of experiments made by Mr. Hay, of Whitrigg, in Roxburghshire, the two first of which is a comparative trial between dibbling and sowing broadcast, which shows that whilst the gross produce of wheat, straw, and chaff is the same in both cases, about four bushels per acre of more grain is obtained from the dibbled portion; the quality of the dibbled wheat is, however, decidedly inferior, it not only containing a greater quantity of light wheat, but the good grain

weighed only 59lbs. per bushel, whilst the grain from the broadcast portion weighed 62lbs. per bushel. Therefore, if the difference in value of the grain be taken into consideration, it is doubtful if any advantage was gained by dibbling. I may observe that in the report an error has been made, which may probably be a misprint: the produce of a quarter of an acre of each is thus stated:—

BROADCAST.

bush. tenths.

11	0	good wheat 62lbs. per bushel.
0	1½	of light.

11	1½	equal per acre to 5 qrs. 4 6-10ths bush.
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DIBBLED.

11	9½	good wheat, 59lbs. per bushel.
0	2½	of light,

12	2	equal per acre to 8 qrs. 6 8-10ths bush.
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Which should have been 6 qrs. 0 8-10ths bushels. In both of these experiments the seed was sown on the same day, the 28th of September: the broadcast at the rate of 1½ bushels per acre, and the dibbled at the rate of half a bushel per acre; but the broadcast was reaped on the 19th of August, and the dibbled on the 26th, being a difference of seven days—a matter of some importance in a late season, and which, with the inferior quality of the grain, corroborates the opinion I had previously formed as to the result that might be expected from thin sowing. In the same report Mr. Hay states that he sowed a field of wheat on the 26th of August, at the rate of nearly two bushels of seed per acre, which proved to be too thick, and that it did not turn out so well as expected, the head being small; but it was reaped on the 13th of August, and weighed 63lbs. per bushel, being six days earlier and 1lb. per bushel heavier than what was sown with 1½ bushels of seed. However, this cannot be considered as a comparative trial, having been so much earlier sown; had it been sown with 1½ bush. per acre, and that sown on the 28th of September with 2 bushels, it would have been a better proportion of seed; but I should think it doubtful if at any time it be prudent to sow wheat so very early as the month of August, as the plant has a great tendency to get too far advanced before winter, and run to straw with a small head—to use an old local phrase, to be winter-proud and bum-bee headed.

Mr. FINNIE, Swanston, said: After the satisfactory manner in which those gentlemen who kindly undertook to take a prominent part in our proceedings to-day have handled the subject under discussion, I am most reluctant to trouble the meeting with any remarks; but as the object we all have in

view is to induce an interchange of our practical experience, I will briefly state the results of two experiments I made with different varieties of wheat. Before, however, proceeding to do so, I would wish to premise that in regard to wheat, as well as all the other cereal grains, the agriculturist has, comparatively speaking, an endless variety from which to make his selection, showing how bountifully Nature has provided for every variety of soil, climate, and system of cultivation, where this plant can be grown advantageously; consequently, it is left to the skill and enterprise of the husbandman to ascertain, from patient experience and observation, what particular variety will suit best on his own particular farm. Suppose, therefore, we take the soil, and we will find that in proportion as clay predominates one variety must give place to another, for what may suit a very stiff soil, or one of medium quality, where the proper proportion of straw can only be obtained by very high cultivation, will be totally unfit for a soil of a different character, and where the crop may be liable to lodge. Then, as to climate. Its very wetness or dryness exercises considerable controlling influences; take, for example, many of those varieties generally termed woolly-eared: these may be well adapted to an English climate; but where rain is the rule and not the exception, as in Scotland, that velvet-like coating which they have undoubtedly retains about the stalk and ears, both before and after being cut, too much moisture. Our altitude must likewise regulate us in our selection. We know well that oats and barley can be grown at a much higher altitude than wheat, and the risk of sowing a late maturing variety in many exposed situations may extend to the loss of the whole crop, however bulky its appearance may be; in short, I have witnessed a great amount of loss from farmers putting too much confidence in either their own experience of any particular variety, extending as that has been only to one year, and at once setting aside the particular wheat they have found safe on an average of years, or, as is very often the case, adopting entirely, or to too great an extent, the experience of others whose climate and soil are totally the reverse of their own. I have therefore used the expression, patient experience; as I hold that no farmer is justified in overturning any part of his system which, from experience, he had been led to adopt, from what he may have found to be in the result of one year's trial; and this conclusion I have arrived at from what I may say is not only the case with myself, but with many others—dear bought experience. I am not, from these remarks, for one moment to be supposed to undervalue the experience of others. I hold such meetings as the present to be of the very greatest importance, by im-

parting new ideas as to our systems of management. I offer them merely for the purpose of guarding my brother farmers from sowing any very large proportion of their crop in any given year with a new variety of wheat, barley, or oats, however highly recommended, without having fairly tested their productiveness for two or three years in succession. The cultivation of wheat within the last ten years in Scotland has obtained a very great degree of importance. Previous to that period, the extent of land under the cereal grains might have been classed thus—oats, barley, and wheat. Now wheat has assumed a different position, being now second in extent to that of oats, and not of less importance in other respects, inasmuch as it is the first class and most productive soils that are selected for its production. This change may be accounted for by the drainage of the land, and consequently larger extent of turnips grown upon land better adapted for wheat than barley. The change has likewise opened up a new field of inquiry, viz., What is the most profitable variety of wheat to sow in spring? Not many years back spring wheat, as it was called, may be said to have been confined to one or two coarse varieties, which, I believe, obtained the peculiar name of spring wheat from having been sown for a series of years in the spring months, and from likewise being found to be early maturing varieties, but originally belonging to autumn wheats. Experience, however, now proves that the kinds generally sown in autumn may be advantageously sown likewise in spring. From the altitude of my farm, and medium character of the soil, it would not be judicious to attempt sowing wheat in spring. My experience has therefore been confined as regards practice to an autumnal seed-time, and to that my future remarks are exclusively confined. In the autumn of 1836 farmers were much impressed with the idea that some of the English wheats could be introduced with advantage, and participating in the same feeling I was induced to make a comparative trial of those of them most in vogue, with a selection obtained in the Edinburgh market of Scotch wheats, but which, unfortunately, the day I did so I found to consist principally of Hunter's, more or less pure. The autumn was most unfavourable for the raising of the potatoes, and the wet weather immediately setting in, these two causes had led me almost to despair of sowing the field with wheat that season. A favourable opportunity presented itself on the 21st of December, and upon a portion where the soil was most inferior I sowed the following kinds; they were all cut the third week of the succeeding September, after a certain extent of land was measured off, in order to decide their respective productiveness. The following results were obtained:—

No.	Weight per bush. bush. lbs.	
1. Wheat selected in the Edinburgh market, having no particular name, but very much resembling Hunter's, gave	6	60
2. Said to be a pure sample of Hunter's wheat.....	7	61
3. Uxbridge White wheat	7	61
4. Smooth-eared White	7	60
5. Carrington White	6	58
6. Heckland's wheat	10	58
7. Red Essex	9	59
8. Smooth-eared Red	9	61
9. Blood Red	7	58
10. Selected in Edinburgh Market, being a good sample of Hunter's	8	61

I sent a bushel of each to be manufactured into flour, and obtained the following return :—

No.	Weight of each Bushel of Wheat.	Produce in fine Flour.	Produce in Third Flour.	Produce in Bran.	Total produce. Fine Flour, Third Flour, Bran.
	st. lbs.	st. lbs.	st. lbs.	st. lbs.	st. lbs.
1	4 3	3 1	0 4½	0 10½	4 2
2	4 3	3 2	0 4	0 9¾	4 1¾
3	4 4	3 1	0 5½	0 10½	4 3
4	4 3	2 12½	0 4½	0 13	4 2
5	4 1½	2 12½	0 4	0 11½	3 13¾
6	4 1	2 11½	0 5	0 11½	4 0
7	4 2	3 0	0 4	0 11	4 1
8	4 3½	3 1	0 4½	0 11	4 2½
9	4 0½	2 12	0 5½	0 10¾	3 13¾
10	4 4½	3 2½	0 4½	0 10½	4 3½

From the foregoing table, first, as regards the acreable produce, the four most productive varieties stand thus :—

1. Heckland's.
2. Smooth-eared Red wheat.
3. Red Essex.
4. Hunter's.

But then as regards the weight per bushel, and productiveness in flour, their position is reverse, viz. :—

1. Hunter's.
2. Smooth-eared.
3. Red Essex.
4. Heckland's.

If satisfied with that experiment, one might have been able to conclude that the succeeding year they were safe in sowing Heckland's, the Smooth-eared, or Red Essex, in preference to Hunter's; but I found each successive year prove the contrary, and that, upon an average of seasons, Hunter's gave the most profitable erop. My idea, whether right or wrong, was, that the late period of the season

when the different kinds were sown, gave, in that particular one, the balance in favour of those that proved most prolific. My impression is, that in a very late season some English variety will suit best; but when the seed time can be got over by the month of November, a Scotch variety is fully more to be relied upon for general sowing in Scotland. For many years, therefore, I kept my Hunter's as the most remunerative on my farm. I afterwards became acquainted with the merits of the Hopetoun, and ultimately found it to be even preferable to Hunter's wheat, as it gave more straw, and fully as much produce in grain, and evidently of as good quality. In 1845 I made another comparative trial with the following, and the order in which I now state them were their productiveness :—

1. Fenton.
2. Taunton Dean.
3. Red wheat.
4. Hopetoun.
5. Pearl.
6. A mixture of them all.
7. Chiddam.
8. A white wheat recently introduced from England, and much recommended.

The soil upon which this experiment was made was rather of a loamy character, and very liable to give over-luxuriance in straw. After years, however, brought me to the following conclusion :—That, except upon the land upon my farm liable to lodge, Hopetoun, on an average of years, was most remunerative; but the Fenton better suited where the soil was likely to cause the crop to run much to straw. I have repeatedly sown the red chaff, red straw, and many others, which have been found to answer well on other farms; but in the meantime I am disposed to adhere to the two kinds I have referred to. The portion of my farm where wheat may be cultivated, varies 450 to 600 feet above the level of the sea, and the soil upon it, generally speaking, of medium quality. The next point embraced in this day's discussion, is the quantity of seed necessary to sow. This must be regulated entirely according to the nature of the soil, climate, season of the year when sown, and condition of the land, and may vary, according to circumstances, from 6 pecks to 16 pecks per Scotch acre. I have found, upon my farm, if sown broadcast, 3 bushels or 12 pecks—if the seed time happens in the end of September, or in the month of October—is equivalent to 4 bushels in those of November and December; and that old wheat admits of being sown much thinner than new, and, when drilled, less is required than when sown broadcast, and that summer fallow land will do with a half less than after potatoes, beans, or turnips; and the very con-

dition of the grain affects the quantity that ought to be sown. In short, no specific quantity can well be stated; it is one of those parts of farm management which must be determined by the skill and observation of the agriculturist. The last point I would touch upon is the comparative advantages of drilling, dibbling, or sowing broadcast. I would therefore say, on all land having a large proportion of clay, or even with a moderate proportion, and when the furrow after the last ploughing leaves a sufficient bed and covering for the seed, nothing will succeed better than by sowing broadcast. On the other hand, when the land is so loose, as not to leave a well raised up furrow for the seed, drilling is the next best to adopt, and if, as sometimes happens, continued rains prevent the drilling machine from working properly, the land may be ribbed by the common paring plough, or by a machine for the purpose, or even the seed ploughed in by a light furrow. The pressure now in use which follows three ploughs, forming a bed for the seed, is a good preparation; but then in rainy weather that operation can be but imperfectly performed. In short, it just comes to this: the farmer is the creature of circumstance, his knowledge must be acquired in the field, and must either adopt one or other of these operations, keeping in view, in the first place, to deposit the seed at a sufficient depth; and secondly, to consolidate the light land as much as possible. I saw upon the home farm of his grace the Duke of Bedford a crop of wheat growing, that had been sown with a dibbling machine, and it looked very well; but upon putting the question to Mr. Burness (the intelligent land-steward of his grace, and who was originally from Scotland), whether from his experience in Scotland, and latterly in England, he would recommend its adoption in Scotland, he said, "I cannot say that I would," and added, "I cannot well account for it, but wheat grows here under very different circumstances than in Scotland." I have had no experience of the process myself, and will therefore neither recommend nor condemn it. Last summer, on my way to the Exeter show, I went and looked over the home farm of Lord Hatherton, and there I saw a comparative trial made between dibbled wheat, drilled wheat, and broadcast wheat. The impression I had, and it struck a friend who was along with me, that the dibbled wheat was certainly the inferior crop. I should likewise add, that by chance I happened to hold a conversation with a baker about a fortnight ago, and I regret that I have it not in my power to give the results of the experiments made with flour from different kinds of wheat, but he told me that Hunter's wheat had certainly proved, as far as his experience had gone, to be the most profitable wheat.

Mr. WALKER RENNIE, Jun., Inchyra, being unavoidably absent, sent the following paper:—This subject is one of great importance to the agriculturist, especially in the locality in which I reside (the Carse of Gowrie), which is known to be a great wheat-growing district. It is to be regretted that in the cultivation of wheat, the most important of all the cereals, so little attention is paid by farmers in keeping the different varieties pure, and in experimenting on their adaptation for different soils and climates—the determination of these points requiring a nicety and minuteness of detail to which most professional farmers are averse. How many instances have occurred where varieties have been obtained from the south of England, which, though found to succeed well in that climate, have disappointed the expectations of the importers, as wanting that hardness of constitution necessary to stand the rigour of a Scotch winter! How frequently, also, does it happen that a particular kind of wheat is loudly commended by one farmer, and as loudly decried by another, not from any defect in the wheat, but from some peculiarity in soil or climate. In the few remarks I shall make, I wish to premise that being unacquainted with many of the numerous varieties of wheat now cultivated, I shall merely advert to those kinds which are the greatest favourites in this district, and of which, from actual experience, I can speak confidently. The varieties of white wheat, there chiefly grown, are the Red-chaffed, Uxbridge, Hunter, Hopetoun, and Fenton. I might enumerate several additional kinds, occasionally introduced from England, such as the Talavera, Chiddam, &c.; these, however, after a few years' trial, have been generally abandoned as unsuited to our climate. The Red-chaffed is a very fine wheat, and is best suited for land which throws up much straw; its defects are want of bulk for the generality of soils, getting thin on the ground towards harvest, susceptibility of injury from shake, and a liability to blight in certain seasons. The Uxbridge produces a fine sample, and plenty of straw; it has been grown here for several years, and continues to give satisfaction. The Hunter wheat was long held in estimation, being not only hardy, but fine in quality, and well-liked by bakers; it is now in great measure discontinued, its place being taken by varieties considered more productive. Of all the varieties I have enumerated, the Hopetoun and Fenton are at present most in repute. The Hopetoun produces a good sample and plenty of straw, and, in this latter respect, is superior to the others. However, from its being subject to the attacks of the fly, it does not often realize, on being thrashed out, the expectations which its bulk, when growing, would indicate. My experience at present would clearly give the preference to the Fen-

ton wheat, as being better adapted than any of the others to this district, where *want of straw* is not a usual complaint; from repeated comparative trials, I should say that it exceeds the Hopetoun in produce by one quarter per acre. The reason of its superior grain-producing property is, that it seems to be more capable of resisting the depredations of the fly, which frequently does immense injury. I have heard it remarked that in the Fenton wheat, a shorter time elapses between the bursting of the ear and the period of its being full shot, than in the other kinds, and consequently that the fly has not the same opportunity of doing hurt. Red wheats are not extensively grown here. I have lately introduced Spalding Red, and find it very prolific both as to straw and grain, and well suited for secondary land. The bearded variety, known by the name of April wheat, I am in the custom of growing; its early ripening habits cause it in many cases to be substituted for a barley crop. It succeeds best when sown about the middle of April. The proper quantities of seed is a subject upon which a great variety of opinions exists. Believing, as I do, that we err in sowing too thick, I sow my fallow with two bushels, and wheat after crop, with three bushels per Scotch acre, and these quantities I find sufficient, if the land is drained and in good condition. I consider the best time for sowing fallow wheat to be from the 18th till the end of September, and wheat after crop, during the whole of the following month. It is rarely that wheat can be advantageously sown after October, unless upon very dry soils. The dibbling of wheat is unknown in this district, neither has drilling hitherto been much practised, the broadcast system being almost universal. As I grow wheat on a considerable extent of light dry loam, I am in the habit of using an implement called a presser, which follows the ploughs when ploughing the seed furrow, and makes a rut of from 4 to 5 inches in depth between each furrow slice; this I find to be an excellent plan, as it insures the seed being put in at an equal depth, and prevents any being lost. It also consolidates the land, and to a certain degree counteracts the injurious action of the frost and sun in throwing out the young plants during spring. In short, I consider that this method, when carefully gone about, is little inferior to the drill.

Mr. DICKSON, Saughton Mains, said: As the subject has been so thoroughly discussed by the gentlemen who have already spoken, I will not detain the meeting farther than to state my own practice. My practice is to sow my wheat in the months of October and November. The quantity of seed I sow is from 2 to 2½ bushels per imperial acre, commencing with 2 bushels, and as it gets later in the season increasing the quantity to 2½

bushels; it is all put in with the drill machine, which I consider much the best mode of sowing wheat. Indeed I am surprised that there should be any difference of opinion on this subject, as the drill places the wheat in the precise position and depth that the sower chooses. I can easily understand that there may be a difference of opinion in regard to the distance between the drills; but this can also be regulated to any width that may be desired. I consider broadcast sowing a great waste of seed, and an unsatisfactory mode of sowing, one portion of the seed being left on the surface and another portion buried too deep, so that the braird comes up unequally. Next to drilling, I approve of the use of the presser before sowing, which leaves an equal depth of seed-bed for the wheat; but the presser is attended with this disadvantage, that the wheat so sown cannot be hoed in spring, which I hold to be of the greatest importance to the successful cultivation of the wheat crop. I believe every farmer has observed the great advantage which any autumn-sown or planted garden-crop derives from the first spring hoeing—for instance, early cabbages; and he can easily understand that autumn-sown wheat being placed in similar circumstances will be equally benefited. The hoeing of wheat is very generally practised in many counties of England, but to a very limited extent in Scotland; and having practised it myself for several years, and found my crop greatly improved by it, I would impress on others the propriety of giving it a fair trial, and I have not the least doubt they will find the same result as myself. With regard to the varieties of wheat, I have been in the habit of making trial by small quantity of every variety of wheat which has been introduced, and after two years' trial rejecting it or increasing my breadth of it, according to its yield. And, generally, I have been better paid by sowing the coarse and hardier varieties rather than those which yielded the finest sample, such as Spalding's Red and Fenton wheat; those, with the Red-straw variety, and a new sort called Kessingland, constitute my crop of this season, and I consider them the best varieties for my farm.

Mr. LAWSON said that as a practical seedsman he had opportunities of observing the peculiarities and distinguishing characteristics of the various kinds of wheat. Mr. Hall Maxwell, the secretary, had requested him to keep himself in readiness to take part in the discussion they had had to-day, and with that view he had prepared a pretty lengthened paper on the different varieties of wheat, but it was too long to justify him in occupying the time of the meeting with reading it. It had afforded him very peculiar pleasure to attend this meeting, having heard from so many eminent agri-

culturists a confirmation of his own views on the subject; and he thought he might state, as the result of the discussion, that the Hunter's, Hoptoun, and Fenton had been found generally to be the most profitable varieties in the districts which had been alluded to. At the same time he wished to notice a very able paper by Dr. Anderson, published in a recent number of the "Transactions of the Society," in which he had gone very minutely into the component parts of different wheat soils in some districts of Scotland, and which exhibited great variation; and it certainly did occur to him (Mr. Lawson), that it was not improbable that further chemical experiments with the grains, as well as with the soils, may point out certain varieties as the most profitable to be grown on certain soils; but at the same time he might remark that, irrespectively of chemical investigation, the combination of length and compactness in the ear presents a characteristic which recommends certain sorts to the attention of the farmer, as suitable for experiment with the view to increased produce in grain. Mr. Lawson then referred to several varieties exhibited on the table, and in alluding to the caution with which new sorts should be introduced into cultivation, mentioned that the "Bellevue Talavera," so highly praised in some districts in England, and which obtained the

highest premiums at several wheat shows, had been found by an eminent wheat grower in East Lothian, Mr. Henderson, of Longuidry, to be the most unprofitable sort he ever cultivated, and also by the comparative trials made at the recommendation of the Highland and Agricultural Society, in 1841 or 1842, with the prize wheats of that year, that our well-known sort, the Hunter's, proved the most profitable in every district, with a single exception, which was the woolly-eared Dantzic on Mr. Dickson's farm at Saughton.

The Earl of ROSEBERY, in closing the discussion, remarked that he thought they had come to a tolerable agreement regarding the three best kinds of wheat to cultivate, but he was sorry to say they could arrive at no conclusion as to the respective advantages of drilling, dibbling, or broadcast sowing.

The SECRETARY stated that the next meeting would be held on Wednesday, the 20th of Nov.; and the subject for discussion would be—"The substances which can be most profitably employed as auxiliary to Turnips in Fattening Cattle and Sheep."

On the motion of Professor Low, a cordial vote of thanks was given to the Earl of Rosebery, for his conduct in the Chair, which his Lordship briefly acknowledged.

The meeting then separated.

AGRICULTURE IN SUSSEX.

We quote from the *Daily News* a letter which lately appeared in that journal from the pen of "A Midland Counties Farmer," relating to Sussex Agriculture and Sussex Stock. Under any circumstances a communication on such a subject would naturally be interesting to a large circle of our readers; but the present letter will be unusually so from its treating on the management of Knell Farm, Beckley, the late occupier of which (Mr. Samuel Selmes) achieved a well deserved agricultural celebrity. The farm now is in the hands of a very deserving successor, Mr. Tilden Smith.

Beckley, Sussex, Sept., 1850.

SIR,—Finding myself in the district in which Sussex beasts are the principal stock grazed, I determined to inspect one of the best herds of this breed. With that view I came to Beckley, on the borders of Sussex, where Mr. Samuel Selmes, of Knell Farm, long kept a large herd of Sussex cattle, which have attained much more than local celebrity, though the breed has never found favour much beyond the confines of Kent and Sussex.

On the eastern side of the Weald of Kent, bounded by the English Channel, lies the extensive and rich grazing district, Romney Marsh; and the same sort of land extends into Sussex by Rye and beyond Winchelsea. It has evidently been formed by the receding of the sea, which recession is still going on. Around Rye, Winchelsea, &c., there are extensive tracts of sandy land which bears at present a little scanty herbage, but which would by and by, in the progress of time, also become grazing ground. I could not help thinking that this land might be improved at once by the use of the same means by which similar sandy wastes in Belgium have been fertilized and brought into cultivation, namely, by sowing broom, spurry, and other green crops, for the purpose of ploughing them in, and so giving to the soil vegetable matter and consistency; and I was told that Mr. Jeremiah Smith, of Rye, one of the largest farmers and hop growers in Sussex, has very successfully improved this sort of land, and brought it into a very productive state.

Some portion of this level tract is still protected from the inroads of the sea by an embankment between New Romney and Hythe, called Dymchurch

Wall, which is more than three miles in length. This is maintained by a rate levied on all the marsh land. That portion of the marsh which is situated in Kent is about twelve miles in length, and about eight miles in its greatest width, and contains 44,000 acres. There is a large extent of marsh land, part of the same level tract, which extends in Sussex about half as many acres as in Kent. This marsh land varies a good deal in composition and fertility. Much of the border of the marsh adjoining the uplands is heavy, stiff, and wet, while much of that near the sea is light and sandy, and liable to burn during the summer. The best pastures lie between the two, and on these beasts and sheep feed rapidly and to a great size. Much of the marsh land is in an arable culture, and produces large crops of grain roots; and I apprehend the greater portion, perhaps all except the best feeding pastures, would be most profitably converted into arable land. Springs of fresh water are met with in certain parts of the marsh, but generally there is a deficiency of water, which forms an additional reason for converting as much as possible of this level into tillage. Draining is required upon much of this marsh land, by which it would be greatly improved. The system of cropping the arable and marsh land is to take wheat and beans in alternate years, occasionally substituting oats or turnips for the beans. As may be supposed, where this course is pursued without ample supplies of manure, as is too generally the case, even the naturally fertile alluvial soil is not in high condition; though with every disadvantage such is the abundance of straw, at all events, grown, that this year as much as 18s. per acre was required and given for cutting the wheat crop. From four to five quarters of wheat per acre is said to be the average produce, the quality not being very good. Large crops of oats are grown here, and turnip, radish, and mangold seeds are grown for the London seedsmen. An immense number of sheep are bred and fed in these marshes; the second-rate land, which will keep from two to three ewes per acre during the winter, and about twice that number in the summer, being used for breeding purposes; while the fattening land will carry four or five sheep per acre through the winter, and feed them in the summer. About 30s. per acre is the rent of the breeding land, and 40s. and upwards are paid for feeding land in the marshes. These sheep are entirely of the Kent or marsh breed. It is a white-faced, long-woolled breed, with large frame, somewhat high on the legs, and a heavy but not well-shaped carcase. The wethers at two years old will when well fattened weigh about twelve stone. Some efforts have at various times been made for the improvement of this breed; in particular, Mr. Richard Goold, of Colshall Farm, near Milton, commenced

in 1795 the creation of a flock which has attained some local celebrity as "new Kents." In that year he selected nine ewes and a ram from Romney Marsh, and, with the exception of using a few rams afterwards obtained from Mr. Wall, a careful breeder of such stock, he produced many thousand sheep; he adhered strictly to the principle of in-and-in breeding. Mr. Goold has retired from business, but his flock is maintained by his successor, Mr. Fullagar. It is said that the improved Kents come early to maturity, have a large carcase, are broad on the back, and deep bodied, and that their wool is both long and fine. The marsh graziers, however, have not adopted this breed to any extent, it being objected that it is too delicate for such exposed situations as they are kept in. Recently several of the Kentish flockmasters have used Cotswold rams for their Kent ewes, and the improvement in the stock from that cross is very great. The Cotswolds are well fitted to correct the sunk and mis-shapen carcase of the Kents, and are as well calculated to bear exposure as the Kents themselves. The Kent sheep are long-legged animals, not very straight in the back, and have heavy pot-bellied carcasses, indicating slow feeding qualities and much offal; their hardy constitution being one of their chief recommendations. But that hardihood does not seem to imply a vigorous appetite; for I was told that Kent sheep will starve on pastures where Southdowns will thrive; and as I know from experience that both Cotswolds and Leicesters will do well on pastures which are too bare or too much run over for the Southdowns, I had a tolerable measure of the real hardihood of Kent sheep. But the system of the Romney Marsh flockmasters seems to be one not much calculated for the improvement of sheep. They depend almost exclusively on the pasture land for maintaining them through the winter, as well as in the summer, and it is only during very severe frosts, or when snow is on the ground, that their old sheep litter hay or a few turnips. Such treatment cannot, of course, be borne by the lambs; consequently, from the beginning of September to the beginning of April, all their lambs are sent long distances up the country to be wintered. The prices paid for the winter's keep is about £5 a score, and in the majority of cases they are very badly kept, returning to the marshes in the spring in a half-starved condition. So weak are these poor creatures that great numbers die on being put on the rich marsh pastures. There is no doubt that by better provision in the marsh district, such as the erection of yards and sheds, the cultivation of roots, and perhaps the planting of trees or hedges for shelter in very exposed situations, a great many of the lambs bred in the marsh might be wintered there. It is admitted

that the great defects of Kentish breeders are want of care and attention in selecting the breeding stock, and insufficient food in rearing the lambs. I met with instances in which the following arrangement is made, viz.: the lambs when put out to keep are valued, and re-valued in the spring when sent home, the owner paying the taker-in the difference, whatever it may be, between the value of the lambs in spring and autumn; if there is no increase of value or a deterioration, the taker-in gets nothing for the winter's keep. I did not learn, however, that this plan has been extensively adopted. Many lambs are taken in to keep by farmers in the Weald and other parts of Kent and Sussex, who have literally no other provision for them than wheat, oat, or clover stubbles, with an occasional change to the meadows; and after Christmas they live principally on the hedges and hedge-rows. It is said that they often go home in the spring "with nearly all the wool off their necks to the shoulders, and partially from the body," caused by their habitual resort to the hedge-rows for food. The author of the prize essay of the Royal Agricultural Society on the farming of Sussex, speaking of this system of putting out lambs to be wintered, says: "There appears to be two parties in error—those who put out their lambs in good condition to be thus treated; and those who take them at a much greater loss, not having a blade of grass left on their lands for cattle of any sort of their own." And he adds, that within the last two years he has surveyed 28,000 acres where this system is adopted, and he found that on farms where two or three thousand sheep might have been permanently well kept, after the wintered lambs had been sent away, there were not more than two or three hundred sheep belonging to the occupiers; and I was not surprised to hear that grazing in Romney Marsh has been for some years past considered but an indifferent business. This gentleman, a farmer and surveyor of great experience, distinctly says that fifty years ago, when the Weald farmers used to wean and bring up Sussex bred calves, keeping a sufficient number as oxen to do the work of the farm, and supply the hill farmers and hop growers of Kent and Sussex with good oxen and steers of all ages, the condition of their farms and supply of manure were better than at present. And all I observed leads me to believe that the substitution of sheep for cattle has not proved beneficial to the farmers of the Weald. In this part of Sussex the arable land is chiefly cultivated in a three-course shift: 1. Wheat; 2. Oats; 3. Seeds, beans, or peas, and the greater part a naked fallow. On this fallow lime is the chief manure, though in many places it costs more for carriage than the first cost of the lime, and having been now too often repeated, produces little effect.

There are many parishes where this system is pursued, in which 18 to 20 bushels of wheat and 20 to 24 bushels of oats have been taken as the average produce for the purposes of the tithe commutation. Here there is much inferior pasture land, which might be usefully broken up if properly cultivated afterwards; but where such a system and such results as I have mentioned exist, I am not surprised to find landowners unwilling to permit their present tenants to break up pastures. Yet some of these farmers persist in maintaining hop gardens, from which they do not grow more than 8 cwt. or 9 cwt. per acre on an average, and have to compete with growers who produce from 15 cwt. to 20 cwt. to the acre. What can be the use of continuing such unequal competition? And yet the farm is robbed of the little manure that can be obtained to supply the hop garden. This is the kind of hop-growing which has brought the occupation into disrepute. I have nowhere met with so little of hopefulness or helpfulness among the ordinary class of farmers as in the Weald of Kent, and the adjoining part of Sussex, where the soil and system are similar; and I must say that unless they can find means to employ more capital I do not see how they can continue their occupations. As a person in the neighbourhood observed to me—"they seem cowed," and I confess, with such crops as they grow, it appeared to me that the sooner they take fright and abandon their occupation altogether the better. That there is good farming in Sussex is certain, but the standard of cultivation amongst the average farmers is a low one, and without energetic aid from the landlords, I do not see how it can readily be raised in the lands of the actual tenantry. I found, on arriving at this place, that Mr. Selmes had lately retired from business, and that his farm had been taken with all its stock by Mr. Tilden Smith, the present occupier. Mr. Smith has the entire herd of Sussex cattle which Mr. Selmes during a long life brought to great perfection, and the same attention they received from their former owner they appear to receive from Mr. Smith. I was not lucky enough to find Mr. Smith at home, but his son showed me the greater part of the stock, and explained to me the system of management. The farm consists of twelve hundred acres, of which the larger portion is rich marsh pasture-land; the remainder rather stiff arable. The arable land is well cultivated, and produces an average of four quarters of wheat to the acre. No wheat has been threshed of this year's growth, so that I could not learn the proportion it bears to last year's crop, which was admitted to be beyond the usual average; but several of the workmen who had worked for many years on the farm told me that they had never before seen so large a crop of straw grown on the farm.

This is what I have everywhere noticed on well-cultivated clay land this year. The course of cropping pursued by Mr. Smith is, 1st, part Swede turnips for feeding his beasts during the winter in yards—remainder a bare fallow, part of which is manured and part limed for wheat; 2nd, wheat; 3rd, oats; 4th, seeds, chiefly mown once. The supply of manure derived from the feeding beasts keeps the land in good condition. There are several large and apparently productive hop-gardens, which require and receive large dressings of manure, a cart-load being applied to every five hills, and there are, I was told, twelve thousand hills in a garden of eleven acres. In the sheep management of this farm there was nothing peculiar, the lambs bred on the marsh being put out to keep, as is usual with other occupiers of marsh lands.

In his Sussex cattle Mr. Smith certainly possesses a herd, the inspection of which will repay any breeder for a visit to this district. Their late owner, Mr. Selmes, some years since challenged the late Lord Althorp to show a certain number of short-horned oxen against an equal number of Mr. Selmes' Sussex beasts, and though I believe the short-horns were successful in the competition, I am now satisfied the challenge was not quite so rash as it would perhaps be generally considered. In fact, however, no true competition can take place between a herd of Sussex and a herd of short-horns; they are animals of essentially different characteristics, and adapted for entirely different systems of management. For early maturity the Sussex beasts cannot approach the short-horn; but, as a beast of draft, to be afterwards fattened when nine or ten years old, I apprehend an ox of Mr. Smith's herd might safely challenge the world. The herd is a large one, no less than forty calves being reared annually, and all are kept until sold off fat. Each calf runs with the cow till three months old, when it is weaned, fed for a short time with a little oilcake and put into good grass. Some of the oxen, and such of the heifers as miss calving, are fed off at early ages; but others of the oxen are worked until eight, nine, or ten years old, and then fattened for two years on the marsh, and sometimes finished in the yards on oilcake, hay, and turnips. The heifers and steers are kept on the marsh during the winter, hay being given in severe weather. I saw 22 two-year-old in-calf heifers, of good size, and some of them of very great beauty. I noticed, however, considerable variation of colour, some being of that dark red which denotes hardihood and pure blood, while others were of a light red colour. This is attributed to the very close breeding adopted by Mr. Selmes, chiefly because he could seldom find a bull of this breed fit to match with his own stock. The majority, however, are of the true deep red.

Amongst the older cows there were several which in breadth of hip, straightness of back, and fullness of the thighs, might compete with short-horns; one, in particular, a dam of a bull Mr. Smith is rearing, I should like to see brought out at the Royal Agricultural Society's show. A fat ox ten years old, and a fat cow eight years old, both of which will probably make their appearance at the next Smithfield Club fat stock show, in London, are worthy of the best attention of stock keepers. This ox has been worked in the team, and this is really the strong point of the Sussex cattle. Mr. Smith works a team of eight oxen,* breaking them in at three years old, and feeding them on grass only in the summer, and straw and turnips in the winter. These working beasts are in good condition, and oxen so well suited to the purpose I never saw; though I could scarcely understand the necessity for using eight in one team at plough. It seems that Mr. Selmes used many more oxen for work than Mr. Smith does, who until he took Knell farm, used horses exclusively; and it struck me that the only substantial reason for working oxen at all was to allow some of the largest and best of the Sussex beasts to arrive at their full maturity and development. The question whether or no it is desirable to promote the improvement and extension of this truly fine breed of stock, depends upon the profitability or otherwise of employing oxen in farm labour. With the exception of certain localities the agricultural community has decided in favour of the greater profitability of horse labour; but I am by no means sure that that decision is final. I know several farmers who have recently begun to use oxen, since railways have enabled them to convey most of their produce to market, and who find ox labour cheaper and not less efficient on the farm. Should that practice extend, then Sussex stock ought to come in for a larger share of notice than it has lately received. After working four or five years, the Sussex beast may be fattened to a great size, though even then he is, I suspect, a great consumer, as much as twelve pounds of oilcake a day being given to him when feeding in the yard. That is one-fourth more than a short-horn ox would require. And Sussex cows are bad milkers, a fault which has probably prevented the extension of the stock beyond Kent and Sussex. To correct this they are crossed with the Jersey and Alderney breeds, and at Beckley I saw five heifers bred by Mr. Russell, a small farmer, by a Sussex bull, out of half-bred Sussex and Jersey cows, which were very neat and promising either for the stall or the pail. Mr. Smith usually sends off 30 fat beasts at

* This is an error. Mr. Smith works *two* teams of oxen, four pair each.

Christmas, chiefly of his own breeding, and then fills up their places in his yards with Welsh runts. Notwithstanding the perfection to which his herd of Sussex cattle has been brought, I believe that unless he has a demand for them as breeding stock—which I did not learn to be the case—or unless he can make them more profitable workers than horses, Mr. Smith would find a good herd of short-horns more profitable on his very useful farm than Sussex stock. He would feed more in numbers

bring them out fat at an earlier age, and produce beasts of higher quality from short-horns. It may be said that with such a herd as Mr. Smith's he can scarcely be expected to change it at perhaps some considerable cost; but had I that herd—always assuming that pure bred Sussex stock of the best type is not in demand for breeding purposes at good prices—I would at once use short-horn bulls; in a few generations a most valuable herd would be the result. A MIDLAND COUNTIES FARMER.

NEWCASTLE FARMERS' CLUB.

STEAM ENGINE—ITS APPLICATION TO AGRICULTURE.

The discussions of the Farmers' Club, suspended during the harvest months, were resumed on Saturday, the 5th Oct. last (Sir M. W. Ridley, Bart., in the chair), when, after four new members had been elected, Mr. Peter Laws, author of the Prize Essay on Draining, introduced the subject of the STEAM ENGINE in its application to agriculture. After some introductory remarks, Mr. Laws alluded to the application of steam-power to the drainage of the soil (whereby, in the more southern counties of the island, thousands of acres have been reclaimed), and to the purposes of irrigation. He then treated of ploughing by steam, and came to the conclusion that team labour was not in any danger of being set aside by the steam-engine. He thought, however, that with light engines and carriages, cheap branch lines, running through our agricultural districts, carrying coal, lime, and manure, to the farmer, and transporting corn, green crops, milk, &c., to the towns, would prove remunerative. We give the latter part of the paper in full:—

“Thrashing is the principal farming purpose to which steam power is applied in this neighbourhood; and it fortunately happens that its application to barn-work is very simple, and easily accomplished. The steam-engine for such purposes differs but little or none from the usual construction; although, certainly, what is called the overhead crank engine is the one most generally employed, as it costs less, is simpler in its parts and fittings, and is easier managed than the beam engine, all of which advantages are of consequence to the farmer. The noncondensing is generally preferred to the condensing engine, on account of requiring less water, and for the reasons I have already given in favour of the crank engine. The noncondensing certainly consumes a little more fuel than the condensing engine; yet, upon the whole, it is the most suitable for farm purposes;

and if well made and managed, a four-horse power engine will not consume more than a hundred-weight of common coals in the hour; and, during the above time, it will thrash from twenty-five to thirty bolls of wheat, according to the yield, and oats and barley in proportion. I am of opinion that where steam power has been applied in this district, in the majority of cases the steam-engine and machinery have been erected upon too extensive a scale; for, in its present form and proportions, it is only upon the largest farms that it can be beneficially employed. Here I think our millwrights are wrong; because a well-made horse-machine is quite competent to thrash the crop, even upon a moderately large farm; and to erect an engine of six or seven-horse power upon any farm not employing more than three draughts, and not fattening cattle, is preposterous in the extreme. In such a case, even setting aside the expense, the boiler requires as much fuel to raise the steam as to thrash the crop, besides demanding more hands to attend the machinery than can generally be spared upon such a farm. Indeed, the advantage of steam power is very questionable upon any farm not working more than three pairs of horses, unless part fattening stock are kept upon it. In such a case a steam-engine is a most valuable acquisition, as it not only thrashes the crop, but affords the means of crushing and grinding inferior grain, pulse, &c., and, if required, cutting hay and straw for fodder. The spare steam may also, when needed, be used for cooking or preparing the food for horses and cattle. I am quite aware many of you will consider the latter operations as not of much consequence; but I must also recollect that there are many agriculturists who do attach much value to them, and my object is merely to point out the most suitable means of performing such operations, leaving the adoption of them to such as have the means and will to carry them out.

"But, to proceed:—I will pass over a large farm, because, if situated in this cold district, no doubt exists of the superiority of steam in preference to horse-power for thrashing; and take the case of one working three pairs of horses, and feeding off in the house a dozen cattle or so, besides dairy stock and pigs. We will also take it for granted that a considerable quantity of inferior and refuse grain, peas, &c., is used for the fattening of cattle and pigs, besides cut hay and straw for the remainder of the stock. Upon such a farm the engine need not be more than three-horse power. Indeed, if well managed it may be less, and yet perfectly sufficient for the purposes to which we wish to apply it. The thrashing machine ought to be simple, and as lightly constructed as is consistent with durability. One rake is sufficient, and is less liable to entangle the straw than when two are used. It ought also to be furnished with elevators for carrying away the thrashed corn into a chamber apart from the barn, and immediately above the dressing machine, which ought also to be driven by the engine, along with or separate from the thrashing mill, at the pleasure of the manager. The thrashing mill is generally driven by gearing, and the subordinate machines by means of straps running on fast and loose pulleys, so as to be set in motion or stopped while the engine is at work. The engine will have a six-inch cylinder and eighteen-inch stroke, making about seventy strokes per minute. The boiler will be about two feet nine inches diameter, and twelve feet long; or if used for steaming food for cattle, it may be preferable to use two boilers, each about nine or ten feet long, and two feet in diameter. They ought to be constructed so as to be used independently of each other; and although they will cost a little more than a single large one, they will, in the end, effect a considerable saving in fuel, by obviating the necessity of using the large boiler when wanted for steaming, or when little work is to be done. The engine ought to have what is technically called lap and lead of the slide, so as to use the steam expansively and effect a still further economy in fuel, and the full working pressure ought never to exceed 45 lb. per square inch. Such a machine will thrash from sixteen to twenty-four bushels in the hour, according to the yield, and will thoroughly separate the corn from the straw, and carry the thrashed corn into the clean chamber, there to lie until the thrashing is finished. The dressing may then commence, which is better than carrying them on simultaneously, as a better sample can thus be obtained, owing to the greater regularity of the feed and blast. The cost of such a machine and engine, including dressing machine and elevators, ought not to exceed £120 at the out-

side; the interest upon which, together with the wear and tear, may be taken as amounting to £7 10s.

"The hands required will be as follows:—A man to attend the engine and machinery, another to feed the machine, two girls to hand up the sheaves, and two women to take away the straw—in all, six hands.

"The expense will be as under—beginning at six in the morning, allowing half an hour at eight o'clock for breakfast, and a quarter at ten—finishing at noon—in all five hours and a quarter. The expense will be as under, setting aside interest upon the prime cost:—

	s.	d.
Man attending engine and machine, at		
2s. per day	1	0
Man feeding machine	1	0
Two girls handing the sheaves, &c., at 6d.	0	6
Two women taking away the straw,		
at 10d.	0	10
Fuel for the engine (cwt. per hour), including raising the steam, 7 cwt., and carriage, at 3s. 6d. per ton	1	3
Oil, tallow, &c., for engine and machinery	0	3
	4	10

"The quantity thrashed in the above time would be about ninety bushels, costing in round numbers rather more than a halfpenny per bushel. The dressing of the corn fit for market, requiring a man and a boy to attend the machinery, take away the sacks, &c. (time required about two hours, or two hours and a half, according to circumstances), would stand as under. The engine might be grinding or crushing grain at the same time and with the same hands.

	s.	d.
Wages of man attending machinery....	0	6
Wages of boy assisting ditto.	0	1½
Fund required for the engine, oil &c.,		
about	0	3½
	0	11

Or less than a farthing per bushel. Stated cost of thrashing and dressing ninety bushels of wheat, 5s. 9d.; or under a penny per bushel.

"Now let us see what the above would cost by horse power. To thrash the above quantity would require four good horses and driver, besides an extra hand to clear away the thrashed corn. The cost of the machinery would be about £60; the interest upon which, together with the wear and tear, would amount to about £4 10s. in the year. The cost of thrashing a hundred bushels of wheat would be as under:—

Man to feed in the thrashing mill, at 2s. s. d.	
per day.....	1 0
Boy to drive, at 8d. per day.....	0 4
Two girls to hand up the sheaves, at 6d	
per day.....	0 6
Two women to take away the straw, at	
10d. per day.....	0 10
Four horses, at 1s. 3d. each.....	5 0
Oil, &c.	0 1½
Per hundred bushels.....	7 9½

"To dress this corn as it is generally done, putting it once slowly through the machine as in the former case, will require as follows:—

Man to measure up the corn.....	0 6
Two women to turn the machine.....	0 2½
Woman to hold the sacks.....	0 2½
Girl to feed in.....	0 1½

Total cost of thrashing and dressing	
100 bushels.....	8 10

Showing a balance in favour of steam power of 3s. 1d., or in other words effecting a saving of 35 per cent.

"But, as I have already said, it is not from the thrashing that the full benefit of steam power is to be derived; inasmuch as, when applied to crushing and grinding grain for home use, it is found immeasurably superior to horse power, affording, as it does, the means of using up the whole of the farmer's inferior corn. In fact, since such corn can now scarcely meet with a buyer in the market, the farmer is almost necessitated to use it at home, and afterwards sell it in the form of beef and pork. It may not be amiss to mention that common millstones answer best for the above purpose when all things are taken into consideration.

"The same saving in favour of Steam *versus* Horse Power applies equally to the chaff-cutter. Whether cutting hay or straw is of real service, would be presumptuous in me to say—as even amongst the gentlemen here assembled scarcely two opinions will be found alike; all I can do is simply to point out the best and cheapest method of performing such an operation—and I again say the steam engine will effect it much cheaper than either horse power or human labour.

"Amongst the miscellaneous purposes to which steam can be applied, I have already mentioned the conveyance of liquid manure and the preparing of food for cattle. In addition to those there are many subordinate machines to which it may form the motive power, such as pumps for supplying the homestead with water, churns, and such like; and, however trivial these may appear to people who have not seen or do not heed them, still they are useful in their proper station, and I am ac-

cordingly bound to give them a place in the present paper.

"I must not omit to state that the spare steam from the engine can be most economically used for heating purposes, and for drying corn. In fact, there are many modes of employing this truly useful servant—far more indeed than the generality of people ever dream of." (Mr. Laws resumed his seat amidst general applause).

The PRESIDENT having put two or three questions to Mr. Laws, to which answers were given,

Mr. J. E. WILKINSON stated that the nearest approach, within his knowledge, to such an engine as the paper described, was that of Mr. Billington, of Preston, who churned, chaffed, and cut turnips by steam; steamed food for his cattle; and having, as landlord of the Black Bull inn, a good deal of washing, he also made the engine wash the clothes.

Mr. WILLIAM STEPHENSON (on the invitation of the President) gave the club the benefit of his experience. It was eighteen years, he said, since he first put up his engine, which is of eight-horse power; and all its power was required to thrash his corn. He put up a steam-engine because his horses were so fatigued after thrashing that they could do no more work that day. He found no difficulty in the working of the engine; for any farm servant of ordinary intelligence could learn how to manage it in a week. The cost of keeping it in order had not exceeded twenty shillings a-year during all the time that it had been in use. The original cost was £150. The saving effected he estimated at 50 per cent. He was, he believed, from £80 to £100 annually in pocket by his engine. The difference between a horse thrashing machine and steam, he estimated at one-half in favour of the latter. He used it also for various other purpose, such as crushing corn, &c. But no farmer, not having more than three pairs of horses, would be justified in putting up an engine; although, certainly, these were not tempting times, the prospect of agriculture being gloomy; but it was to be hoped that they would improve. His friend, Mr. Burnett, who had used an engine for twenty years, applying it to all purposes, could speak to the value of steam power.

Mr. NICHOLAS BURNETT said he had found great benefit from the use of his engine. He applied it to various purposes. When going it was employed to turn the winnowing machine. It did everything, in fact, that it could be made to do. It did not plough, certainly; but, notwithstanding what his young friend had said, he hoped the time was coming when the land would partly be ploughed by steam. He remembered, fourteen years ago, going to see a steam-engine plough

Lucker Moss. It did not answer, certainly; and the engine was there yet, sticking in the bog, and, while all the world was on the move, it was making no progress; being bound to the soil, he supposed, by some sort of mortgage. It was, however, an unfortunate locality for such an experiment, the land being mid-leg deep in moss. His (Mr. B.'s) engine was of seven-horse power, which was little enough; but less would do for the thrashing machines of the south, which were made with bolters.

Mr. WEEKS expressed his surprise to hear it said that so much power was required. He found two horses, or rather ponies, quite sufficient for his machine, which thrashed, ground, and cut straw, all at the same time. He certainly did not get much wheat, but plenty of straw. He should think an engine of three-horse power would be quite sufficient. He might state that he had a boiler placed behind a fire-place, which steamed food for sixteen head of cattle, and only required that the fire should now and then have an extra shovelful of coals. He should say that a two-boiler engine, as recommended by Mr. Laws, would be preferable to one with a single boiler.

Mr. BURNETT said, the fitting-up of a two-boiler engine was much more expensive.

Mr. STEPHENSON observed, that with an engine of so little power as Mr. Weeks suggested, a man occupying two or three hundred acres must be thrashing every day in the week.

Mr. BURNETT: And Sunday into the bargain.

Mr. WEEKS, in replying to a question from Mr. Burnett, said his machine was one of Garrett's: it was not a bolter.

Mr. BURNETT said he would look in and see his friend, Mr. Weeks' machine at work.

Mr. JOHN BROWN said he was having a six-horse

engine erected, which was guaranteed to grind and thrash and cut, all together. He would let the Club know the result. He only grew ten acres in the year—ten to a shift. With two horses he found that he could not thrash: they could not live.

Mr. BURNETT having disparaged Garrett's machine, observing that there was a deal of friction, and the fewer bands you had the better.

Mr. COLBECK expressed his concurrence in the condemnation. A friend of his was unfortunate enough to put up one of these machines, and had to pull it down again.

Mr. BURNETT said he once went to the farm of a gentleman whose name had made a great noise; and he found, to his surprise, that his steam and other machinery was laid aside, and he had gone back to the flail! A little of that gentleman's experience would be valuable to the club. This was what he (Mr. Burnett) called gewgaw work.

Other members having spoken, Mr. Burnett moved a vote of thanks to Mr. Laws. His paper, he said, was a very valuable one; but perhaps the argument was sometimes too fine-drawn—too much in favour of steam. He had no doubt that it would prove an acceptable contribution to the newspapers. It must be a great relief to the editors to have the club once more in action; for they had been sorely at a loss, of late, for matter to fill out their columns; and he knew not what they would have done had it not been for the quack medicines.

Mr. WILKINSON seconded the motion; and the President having expressed his warm concurrence in the compliment, it was carried by acclamation.

The meeting then broke up.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The COUNCIL resumed their sittings, after the usual autumn recess, on Wednesday, the 6th of November, when a monthly meeting was held at the house of the Society, in Hanover-square. The chair was occupied by Mr. RAYMOND BARKER, V.P.; and there were also present, Lord Portman, Lord Southampton, Hon. H. W. Wilson, Colonel Austen, Mr. Barnett, Mr. Beasley, Mr. Burke, Colonel Challoner, Mr. Garrett, Mr. Fisher Hobbs, Mr. Kinder, Mr. Milward, Mr. Shaw (of London), Professor Simonds, Mr. Simpson, Mr. Thompson (of Moat Hall), Professor Way, and Mr. Jonas Webb.

The names of 44 candidates for election at the next meeting were read.

Finances.—Colonel CHALLONER, chairman of the

Finance Committee, presented the report on the accounts of the Society to the end of the previous month; from which it appeared, that on the 31st of October the current cash-balance in the hands of the Bankers was £927. Colonel Challoner having further reported, on the part of the Committee, the closing of the country meeting account at Exeter, the Council passed a vote of their best thanks to Messrs. Sanders and Co., who had so kindly accepted the appointment of local bankers to the Society, during the period of its Exeter meeting, and who had with so much courtesy and exactness transacted the Society's financial business on that occasion.

Lectures.—The Council decided that it would be advisable this year to postpone the lectures usually

delivered to the members, on the occasion of their December meeting, to a more advanced period of the session, when a greater number of the members could more conveniently attend their delivery. Professors Way and Simonds expressed their readiness to obey the call of the Council, whenever it was thought that their services would best tend to promote the objects of the Society, and the convenience of its members.

Pavilion Dinner.—The Hon. R. H. Clive, M.P., and Mr. Shaw, the stewards of the Pavilion dinner at Exeter, having communicated to the Council the inconvenience arising from persons being admitted into the Pavilion at the time the arrangements for the dinner were in progress, it was resolved, on the motion of Lord Portman, "That, at future country meetings of the Society, steps be taken to prevent the admission of any party into the Pavilion, during the preparations for the dinner, without express permission from the stewards of that department."

Judges.—Lord Portman, Mr. Shaw, Col. Challoner, and Mr. Fisher Hobbs, having expressed to the Council their views on the desirableness of a still further improvement on the present mode of nominating, selecting, and appointing the judges for the country meetings of the Society, it was carried, on the motion of Mr. Thompson, that the whole question should be referred to a special committee, consisting of the following gentlemen, who should be requested to report their recommendations to the Council, viz.: Mr. Thompson, Mr. Shaw, Mr. Fisher Hobbs, Mr. Garrett, Col. Challoner, Mr. Jonas Webb, Lord Portman, Hon. Capt. Pelham, M.P., Mr. Hamond, Sir M. W. Ridley, Bart., Mr. Hudson of Castleacre, and Mr. Jonas.

Cattle-Yard Shedding.—On the motion of Mr. Fisher Hobbs, seconded by the Hon. H. W. Wilson, it was resolved, that previous to the conclusion of the contract for the cattle-yard of next year, Mr. Manning, the Society's contractor of works, should be requested to furnish estimates of the additional expense that would be incurred by rendering the covering of the cattle-sheds impervious to rain.

Implement Exhibition of 1851.—Mr. W. N. Nicholson, of Newark, transmitted to the Council a copy of the letter he had received from the Executive Committee of the Royal Commission for the Exhibition of 1851, in which he was informed, "that the Agricultural Implement Department would be entrusted to the Agricultural Society of England." The Council instructed the Secretary of the Society to communicate with the Executive Committee on this subject, pointing out to them their misconception of the arrangements under this head, and calling their attention to that portion of the Report of the Council to the General Meeting of the Society in May last, in which the distinct arrangements of the Society with the Royal Commissioners were announced; namely—

"The Council have accepted the invitation of the Royal Commission for the Exhibition of the Works of Industry of all Nations in 1851, to hold a Show of Cattle in Hyde Park in that year; but finding that the Royal Commission have included in the arrangements for their own Exhibition a department for agricultural implements, the Council, with a view of not interfering with this department of the Royal Exhibition, have resolved to omit the implement portion of the Society's Show in 1851, and to confine their exertions entirely to their Show of Cattle, as invited by the Royal Commission, and to take every means to render that Show interesting as an exhibition of Breeding Stock."

Fabricated Reports.—The Secretary laid before the Council his correspondence with the Editor of one of the morning papers who had incautiously, and without authority, given insertion to the fabricated report of a pretended meeting of the Council, assumed to have been held on the 24th of October, which had been extensively copied into other papers throughout the country, and had thus been the means of misrepresenting the Council and its actual proceedings. The Editor, in justification, stated that the report in question had been received from one of the class of persons known as "Penny-a-liners," who were in the habit of supplying miscellaneous information to the public papers.

Veterinary Science.—On the motion of Lord Portman, seconded by Mr. Thompson, it was resolved that Mr. Fisher Hobbs, Mr. Jonas Webb, Colonel Challoner, Lord Portman, and Mr. Shaw (of London), be appointed a committee, "to confer with the Governors of the Royal Veterinary College, during the week of the ensuing December meeting, to consider the best arrangements for carrying out their mutual object to promote the extended application of veterinary science to cattle, sheep, and pigs."

Smithfield Club Show.—Mr. Brandreth Gibbs reminded those members of Council who intended to be exhibitors at the ensuing Christmas show of the Smithfield Club, that the last day for making the required entries would be Saturday the 16th of November.

Cottages.—The Duke of Bedford presented to the Council, for the library of the Society, a copy of an enlarged publication of the plans for Agricultural Cottages, communicated by His Grace to the Earl of Chichester, and published in the Journal of the Society. The Council accepted this present with a vote of their best thanks.

The best thanks of the Council were ordered for the numerous presents and miscellaneous communications then laid before them, which they ordered to be reserved for further discussion at the weekly meeting on the 11th of December.

The Council then adjourned to their monthly meeting on Wednesday the 4th of December next.

THE LONDON FARMERS' CLUB.

THE IMPORTANCE OF SOME GEOLOGICAL KNOWLEDGE TO THE FARMER.

The members of the club re-assembled, after the vacation, on Monday, November 4, at the Club Rooms, Blackfriars, when the attendance included many of the leaders in discussion. Subject—"The importance of some geological knowledge to the farmer," introduced by Mr. W. B. Webster, of Houndsdown, Southampton. The chair was taken at the usual hour by Mr. J. Payne, of Felmersham.

The CHAIRMAN, in opening the proceedings, said : I am sorry to say, gentlemen, that although a long time has elapsed since I last had the honour of addressing you in the position which I now hold, I have nothing good to say concerning our condition as agriculturists ; but, as we go on, we seem to be daily getting worse. (Hear, hear). I am not generally given to despair ; but this state of transition—I believe that is the term used by many who take the opposite view of the question to my own—(laughter)—this state of transition has certainly been prolonged beyond my own expectations and convenience (laughter). This, perhaps, is not the proper time to say much with regard to the actual position of the tenant-farmer ; but I must say that I wish he were in a position upon which I could congratulate him, instead of being in that which he is. Everything that we see and hear from day to day shows more clearly that all the prophecies which were uttered three or four years ago as to the future success of the farmer have been completely falsified. (Hear, hear). However, as this is a sad subject, and as I am not much given to gloom, I will now introduce to you a gentleman who will enlighten us upon a subject which will, I have no doubt, prove one of great importance to the agricultural world ; but I must say that if he were in a position to shew this evening how, in the course of a month, a shilling a bushel might be added to the price of wheat, he would confer a greater benefit upon us than it is possible for any mere geologist to do. (Hear, hear, and laughter).

Mr. B. WEBSTER then proceeded to introduce the question. He said he did not anticipate being able to tell them how a shilling a bushel could be immediately added to the price of wheat. The great question then to be considered was how they could grow a greater quantity without increasing the price. (Hear, hear). The manufacturers of this country had for years been calling science to their aid, and ascertaining how the commodities and comforts of life might be produced at the cheapest rate, and the question was whether as agriculturists they might not and should not pursue a similar course. (Hear, hear). He must tell them at the outset that he never attended a lecture on geology in his life, and knew nothing whatever of the subject, until a very few years back. He would state how it was that he came to acquire the knowledge which he

possessed. In wandering over the country he had often found himself at a loss to understand the different kinds of soils which he met with ; and in consequence of having felt this disadvantage he determined to pay some attention to the science of geology, and satisfy himself as to whether there was anything in it, or whether it could be turned to profitable account. Having since travelled over the greater portion of England, and a large portion of Scotland and Ireland, and having examined the soils of the different districts which he had visited, he was so thoroughly satisfied that the science was of great value to agriculture, that he was induced to introduce it to the Farmers' Club ; and he trusted that although it was not likely to enhance the price of wheat, he would be able to shew on that occasion that it would enable the farmer to produce a larger quantity. (Hear, hear.) There could be no doubt but that a good geological map would give the farmer the general character of the soils of the country—particularly as regarded the substrata ; would distinctly point out where tracts of fine alluvial soil existed, and would shew where the various descriptions of clays and sands, and chalk limestone, and building-stone of various kinds could be obtained. It would also ensure certainty with regard to coal. But let an agriculturist possess not only a good geological map, but also some knowledge of the subject derived from practical observation, and he would know much more than this. If he were about to hire a farm or to purchase an estate before he has ever seen it, geology would inform him whether it was likely to be good—whether it would grow wheat, beans, barley, oats, and turnips, and whether a particular soil was likely to pay for reclaiming or improving. It would also give him a very good idea of the character of the country around. It would tell him whether it was likely to be good sheep land or not ; whether there were a kindly soil for grass, and what description of grass would grow most freely. It would tell him whether the land required drainage or not, and whether it were likely to be wetted from strong springs, under water, or have a retentive subsoil. It would tell him whether good water was likely to be found, and its quality—if suited to irrigation and the soaking of flax, or otherwise. It would give him an idea of the expenses of cultivation, and of the probable returns. It would give him a certain knowledge as to building materials—such as stone for draining, road making, limestone or chalk, and the distance from coal. It would inform him whether the country was likely to be dry or damp. If he hired a farm or purchased an estate, a knowledge of geology would inform him as to the kind of manure that was likely to succeed on his land, such as bones, lime, and liquid manure. If he were about to plant, it

would inform him as to the kind of timber most likely to answer, climate and aspect always being taken into account. It would inform him whether paring and burning the land were likely to answer, and whether clay ashes would be as useful as in other localities; and it would give him some valuable information on the subject of subsoil ploughing, and bringing the subsoil to the surface. It would inform him whether sainfoin, lucerne, carrot, parsnip, chicory, Italian rye-grass, and so on, were likely to succeed or not. It would inform him whether he was likely to find any valuable marls or natural bone earth, such as that recently discovered on Mr. Pain's farm, near Farnham; and if on any portion of the property a large quantity of gravel were found, it would tell him what would be found below if that were removed. In his drainage operations it would tell him what material he would be likely to cut through, and whether he would meet with much stone, or with that ochrey water which tended to stop up drains. It would tell him much as to the various strata, and from what quarter the water came. It would also inform him as to the clays in the neighbourhood for brick and tile making; not only where to find them, but the quantity of coal likely to be required for burning, and the value of the articles when made. It would further inform him as to the slope to be given to banks, ditches, and the sides of streams, and would give him some idea as to the expense of cutting the drains. It would inform him whether the land was likely to make good butter or cheese; and if the cattle took to scour, the cause and perhaps the cure. It would inform him as to the system of cropping likely to answer best; and he had some reason to believe that it would explain the cause of some land growing bad malting barley and other land good, and similar would be its use with regard to seed. He had no doubt himself as to the effect of some geological formations on the breed of different animals, more particularly as to the size of bone and the quality of wool. He was now making some notes on this latter head, and would be happy hereafter to communicate the result. He would now give his reasons for thinking that geology would be of that service to agriculture which he had just stated. In the first place there could be no doubt that it would be found by experience that the soils in the different parts of the country would be found to correspond with the different formations marked on a good geological map (He then pointed out on the map the course of the strata, and the formations in different parts of the country.) It was, for example, unquestionable that in any part of Kent would be found a chalk soil; whereas in many parts of the north it was equally certain that they would find coal substrata. As little doubt could there be that the soils cultivated by farmers in different districts were produced by the disintegration of the rocks found below. Although in many parts of the country, from the action of water, various portions of other rocks had been washed over and deposited upon those found below, yet it would be found that the general characteristics of the same geo-

logical formations were decidedly similar. If, therefore, the son of a farmer, having a good knowledge of geology, after living in the Weald of Kent, went up to the north of England to take a farm, his geological knowledge would tell him that, although he might find clay on the farm, yet it was not similar to the clay of Kent, and that he must adopt a different system of cropping from that which he had been accustomed to see in his own district. Thus he would have valuable information at starting, and would turn it to good account if he meant to farm well. Whereas formerly, if the son of an agriculturist, who knew nothing whatever of the peculiarities of different soils, started from the Weald of Kent to farm in Scotland or in Ireland, or in the north of England, he generally considered that, because he found a clay, and had been used to cultivate that kind of soil in a particular way, the same system would do again. In this respect he was very much deceived; for the soil of the Weald of Kent would not be found in any other part of the country. Therefore he considered that information with regard to geology was calculated to prove most valuable to farmers, and would enable them to tell what description of farming was most suited to a particular kind of soil. There might be some difficulty at first, when dealing with a particular formation, and in finding out what formation it really was. It was quite impossible for him to enter, within the short space assigned to him, fully into the consideration of the fossils found in the different geological formations; but so complete was the science in that respect, that a good geologist, going into any part of the country, on picking up a shell, would tell from his examination of it what was the nature of the substrata beneath (Hear, hear). But little difficulty would be found, with the assistance of such works as had recently been published—for instance, Mr. Morton's work on soils—and of a good geological map, on the farmer's making himself acquainted with the principal formations. Although it was impossible to assert with truth that the decomposition of any rock would of itself make a good soil, yet there could be no doubt that such knowledge as he was mentioning would constitute an immense mass of valuable information. To take the case of granite, of which many of the finest buildings in London were composed, if they went to the island of Guernsey, which was nothing but granite, and where the soil was composed entirely of decomposed rocks, they would find one of the most valuable soils which could possibly be possessed for agricultural purposes; but when they looked into the matter they would find that the value of this rock was not entirely owing to the circumstance of the geological formation being granite: there was the climate of Guernsey to be taken into account: it being in the south, helped vegetation very much. They would find, too, that the granite of Guernsey contained an immense quantity of felspar, which in its decomposition gave an immense quantity of fossils; and therefore it must not be supposed that all granite would produce a soil similar as regarded results to that of Guernsey. If offered an estate which

had a granite formation, he would, of course, be aware that granite made a good soil; but then if he found only quartz and mica, though the rocks might be very good for building purposes, it would not be equally good for agricultural purposes. But if, on examination, he found a large quantity of felspar, which yielded not less than 8 per cent. of potash, he would then know that, although the estate might be in a barren state—although, that is, it might never have been cultivated—yet it was well worthy of cultivation, and he would also know perfectly well how to go to work upon such a soil, having the experience of others to guide him; whereas if he knew nothing of geology, and went to Hampshire, which had what was called in the district a plastic clay, and were to adopt the same mode of cultivation as under the circumstances which he had indicated, the result would show that he had been entirely wrong. He contended, therefore, that a knowledge of geology was of great importance to farmers as a body, and trusted that the subject would be regarded by them in that light in future. It was not to be supposed that farmers' sons would always continue settled in the neighbourhood where they had been brought up and received their education in the cultivation of the land. Many of them, by the force of circumstances, were compelled to remove to distant parts of the country; some even went to America, or to one of the colonies; and whenever they did so, they would find a knowledge of different geological formations, and of the laws which regulated different descriptions of soil, of vast importance in relation to the result of their operations (Hear, hear). It was quite impracticable for him to go into anything like a hundredth part of the important points embraced in the subject; but he was happy to see there several gentlemen—amongst others Mr. Wood, from the Weald of Kent, and Mr. Bennett, from Cambridgeshire—who would, he had no doubt, give valuable information with regard to their respective soils, systems of manuring, modes of ploughing, subsoil draining, and so on. They were not to expect a similarity of operations in all parts of the country (Hear, hear). Nothing could be more absurd than for a man to assert that, because he had found a particular system of drainage, cropping, or manuring to answer, others would, if they pursued the same course, arrive at the same result (Hear, hear). It often happened that the soil was found to be as different as possible within a single mile (Hear, hear). In the previous week he went over an estate, the soil of which consisted of three or four varieties. What he wanted the agriculturist to do was to satisfy himself that it was perfectly ridiculous to attempt to arrive at any certain conclusions with regard to agriculture and its operations, without taking the nature of the soil, and therefore the subject of geology, into account. He was perfectly aware of the difficulties and prejudices with which the subject was surrounded. An old farmer said to him—"What is the use of your telling me that there is a chalk formation below, when I know that there are fourteen or fifteen feet of gravel near the surface?" (Hear, hear.) He was aware that diluvial de-

posits were to be found in all directions, and that this formed a most important element in the consideration of the subject. Still geology would be useful to the man who knew what was below, for it would assure him that if the surveyor of roads were to come to him and offer him 5s. a load for his gravel, it might answer his purpose to accept the offer, seeing that he would find a valuable soil beneath; whereas, without a knowledge of geology, he would not know how to proceed under such circumstances. He thought he had now said enough on the subject for the present. Most happy would he be to answer any questions which might be put to him; but, on the other hand, he hoped to obtain some valuable information himself from the succeeding speakers. He would candidly tell them that five years before, he knew no more on the subject of geology than the most ignorant person, and yet if he were to go off that evening by train to any part of the country, he would be able to predicate as to the general character of the soil, and the most material circumstances connected with it, simply from having endeavoured to make himself acquainted with the subject within so recent a period. He thought the whole subject well worthy of attention, in order that the farmer might know what modes of cultivation were best adapted to different parts of country and to different descriptions of soil (cheers).

Mr. MORTON said there were some points introduced by Mr. Webster on which he perfectly agreed with him. He admitted the advantage of a knowledge of geology to the builder, the advantage of it to the drainer, but he was not sure that its advantage to the cultivator of the soil was so great as Mr. Webster had represented it to be. It struck him that the cultivator's object was to find out that kind of soil which was most productive, requiring the least amount of labour, and then, whatever soil he might be placed upon, to set about making it, as far as practicable, similar to that which he had found most productive. So far as it would enable him to do this, geology might come to his aid. It might enable him to mix sand with clay and clay with sand, and to apply to his use the various vegetable matters within his reach; but he was not sure that there was any particular soil which was adapted to the production of fat mutton with little bone, any more than lean mutton with large bone. That depended entirely upon the animal. Upon the chalk downs and upon other downs, upon the Cotswold downs and upon thin soils, sheep had been found of great varieties of usefulness. Some soils had produced long-legs, muscle, hair, and horn—animals capable of running and of being hunted down; whereas in other cases sheep of the very same breed, perhaps, fed upon the very same downs, had been short-legged, and short-boned, and had been found capable of producing a great deal of fat. He thought that so far as a knowledge of geology would enable the farmer to get his land into that state which he had found the most productive—he spoke now of alluvial soils—it would be of great advantage to him; but he did not think it would enable him to produce good cheese or good beef and mutton. They had ex-

cellent cheese in North Wiltshire; they had good cheese in Devonshire and in Dorsetshire, simply because there the butter was taken away and sent to London (laughter). They had excellent cheese in Gloucestershire, or what was termed "coward cheese," the cream there not being taken off. In Somersetshire and Devonshire the cows were pastured upon the blue lias, and in Gloucestershire principally upon the same formation. Then, again, Cheshire cheese was made upon the coal formation, marl, sandstone, and so on. The best cheese of all was made in Derbyshire, upon the mountain limestone; while the Stilton cheese was made on very poor Oxford clay. Leicestershire cheese also was very good, being made upon sandstone. It was, then, evident that the quality of cheese did not depend upon the soil, but upon the milk. He had seen on the same farm cheese made by one dairy-maid of very bad quality, and by another who succeeded her of the very best quality. In that case, as in others, the cheese depended on the cream, the curd, and the dairy-maid. Then, again, he thought the production of corn depended not so much upon soil as upon climate. Sand produced a beautiful sample of wheat, as might be ascertained by attending Guildford market. Perhaps the best wheat sample brought into London was that which came from Essex, which might be owing to the fact that the clayey soil of that county had a considerable portion of sand mixed with it. With regard to the geological character of the soil being the result of the degradation of the formation he would observe that there were found at various depths diluvial deposits. As regarded, for instance, the chalk formation, there were not twenty miles of country in any one direction upon which the chalk was pure. When a section was cut they frequently found the chalk hollowed out, and the hollows filled with clay, sand, or gravel. Almost every formation had a drift peculiar to itself. The drift of the chalk in Hampshire, Sussex, and Kent are very different from the drift of the chalk in Norfolk. The drift in Norfolk was a clayey substance, while in Hampshire it was gravel and sand. Again, if they went to Yorkshire they found the drift upon the chalk different from that in Lincolnshire and Norfolk. The "northern drift," as it was called, came sweeping over from the north-west, until it got near to Cambridge—not quite to Oxford, but within a few miles of Cheltenham; and that drift was very different upon the southern formations. So that it was the character of the drift that they had to do with in these different formations, much more than the character of the degraded formation itself. As he said before, so he would now repeat, that he thought the great advantage of a knowledge of geology to the farmer consisted in its enabling him to bring the soil upon which he was placed as nearly as possible into that state in which it would be the most productive. The advantages of the science to the agricultural engineer and the drainer must be very great, because there were some sorts which formed naturally a *dépôt* for water, such as chalk being held up by the gault underneath. That was the cause of the Artesian wells. By tapping any of those impervious soils which lay upon chalk, either

by digging down to the chalk or by boring a hole, they might get at the water at once, without the expense of an outfall; and in some parts of the country that operation was frequently performed. Upon the Gloucestershire hills that plan had been pursued for the last fifty or sixty years. He was not aware that there was anything material which he could add on the subject of geology in relation to farming.

Mr. SHAW, of London, said that although he was not disposed to attach all that importance to science in aid of the practical farmer which was ascribed to it by some persons in the present day, yet he felt convinced that agriculture was based upon science (Hear, hear); and although it might be true that hitherto the best farming had been the result of rules derived from practical experience, and hence that persons generally imagined that to practical experience alone good farming was to be ascribed, still he believed that in farming, as in all other pursuits, while experience might in the first instance ascertain facts, and hence enable theories to be established, when the facts had been recorded and the theories propounded, science must be exceedingly valuable. Were he to attempt to offer any remarks as being skilled in the science of geology, and to endeavour to illustrate its advantages, to the builder, the drainer, and the farmer, he would be assuming a position which he was not capable of properly filling. He was induced to rise partly because he wished to excite discussion, and thereby to induce others to follow him; and partly because he thought his friend Mr. Morton had laid himself open to remarks. In commenting upon Mr. Morton's observations, he might be digging a pit for himself to fall into, but he should be perfectly contented provided he elicited information. His friend had said, if he understood him rightly, that the propensity of an animal to lay on mutton or fat, to acquire small bones or large ones, was not at all dependent upon the locality in which the animal happened to be bred and fed, but upon the intelligence of the farmer who bred and reared it. Now he must confess that, as far as his observation and experience went, that proposition appeared to him at variance with facts. He had thought, and he still thought, that although man's intelligence and skill could direct nature, yet nothing was more clear than that a particular soil was especially adapted to a particular animal, and that one district of the country would produce one class of animal in a greater degree of excellence than another. (Hear, hear.) Although human exertion would do a great deal towards rendering an animal useful upon a soil for which it was not naturally designed, or to which it was not naturally adapted, still he thought it impossible to avoid seeing that there were particular classes of animals which were specially adapted to particular kinds of soils. (Hear, hear.) He apprehended that his friend Mr. Morton would not say that all the intelligence which the practice and science of agriculture could bring to bear would make the Leicestershire sheep do well upon Sussex Downs, or the sheep of Sussex Downs do so well upon Romney Marsh (laughter). He owned it appeared to him that nature had adapted the animal to the soil, and, to a cer-

tain extent, the soil to the animal, and that no human ingenuity could possibly overcome the peculiar adaptation of a particular animal to a particular soil. There was one class of animals with respect to which he had been entirely unable to account for its being found only in one locality, or within a moderate distance of that locality, though great pains had been taken to breed it in other parts of the country—he referred to the Suffolk horse. He saw a smile on the face of his friend Mr. Hobbs, which meant, he supposed, “You forget that I, an Essex man, got the prize when contending against Suffolk breeders” (laughter). It was his knowledge of that instance which had led him to qualify his observation as to the limits of the locality (laughter); but he could not help entertaining the idea—he might be in error—that there was a locality in the county of Suffolk where animals did come out better than elsewhere, irrespective of the peculiar talent of those who had bred them. (Hear, hear.) Hence and for similar reasons he thought there were certain localities to which certain classes of animals were peculiarly adapted. He was not prepared to concur with Mr. Morton in declaring that as regards animals the science and practice of agriculture was capable of entirely changing nature. Mr. Morton had spoken of Gloucestershire. Now somehow or other it did happen that in a certain locality in the Cotswold hills a certain character of sheep was found to answer better than any other. He did not think Mr. Morton would say that if the Southdown sheep were taken to the Cotswolds they would do equally well. He might say that the mechanism of the animal would not do, that it could not stand the wet land; but if he said that, he admitted a great part of his (Mr. Shaw's) case. In his remarks upon cheese and butter Mr. Morton seemed to think that the difference in cheese was entirely owing to the taking away the butter. There could, of course, be no doubt that the taking butter out of cheese made a great difference in the quality of the cheese (laughter); but, notwithstanding the skill of the good dairymaid who, having succeeded a bad one, made cheese of the best quality, he had no hesitation in saying that there were certain kinds of soil which, though they would feed bullocks well, would not make good cheese. (Hear, hear.) For example, in the case of Somersetshire, very good cheese was made at the foot of the Mendip hills, whereas in the vale below, the land would not make cheese of anything like the same quality, although it would fat a bullock of the largest size. Hence there must be something more than the nature of the animal and the management of the dairymaid; certain soils must be adapted for particular animals and capable of producing particular results; and this showed the value of a science which enabled us to obtain information in reference to the nature of soils. Again, his friend had said that there was good wheat in Essex, and that that was owing to the clay and sand. Now in saying that, he had admitted a very great part of the proposition advanced by Mr. Webster—namely, that a knowledge of geology would be advantageous to the farmer, because if it were granted that a certain soil would produce the best class of wheat, it was only necessary that the farmer should be able to judge whether

or not the soil under his observation possessed certain qualities, and he would then be enabled to determine what modes of cultivation it would be best for him to adopt. (Hear, hear.) For his own part he attached great importance to the character of the soil, and he should be borne out in asserting that experience would enable any one to determine what would be the products of a soil of a particular character. He did not go so far as Mr. Webster, in thinking that if a geologist went by railway into any part of England, with a map in his pocket, he would be able to tell what were the peculiarities of any soil he might look at so as to enable him to farm it properly.

MR. WEBSTER.—The general character.

MR. SHAW: The general character would not be sufficient for the farmer. It might do very well for the geologist to be able to tell wherever he went what stratification of rocks was beneath a particular soil; but what they had to ascertain that evening was, whether or not geology might be rendered practically useful by the farmer. Such general knowledge as Mr. Webster spoke of, would not be such a knowledge as would justify him in the case supposed by Mr. Webster, in purchasing any estate or hiring a farm; it was not such knowledge which would enable him to say, “If I purchase this estate, or hire this farm, I may expect such and such results.” As he had intimated at the outset, although he was prepared to admit that a knowledge of geology was useful to the farmer, he did not wish it to go forth that that club considered it so immediately advantageous to the practical farmer that it would enable him to attain great results (Hear, hear). It was a step in the right direction—a branch of knowledge which might, by and bye, be made extensively useful; but they must take care, when expressing themselves as to the advantages to be derived from science, to remember that those advantages could only be secured in connection with practice and experience; and they must not lose sight of that which presented itself to the minds of those who first formed the Royal Agricultural Society, that however highly they might esteem science, practice was always to be placed before it, as it had been in the motto which they adopted—“Practice with Science” (cheers).

MR. MORTON wished to make a few observations in explanation, in consequence of the allusions which were made to him by Mr. Shaw. With regard to the allegation that the Southdowns could not be so well fed in another district, he would observe that some Southdowns were fed in Lincolnshire upon chalk of the same description as that to which they had been accustomed. What was the result? In the one case they had averaged from 15 to 22lbs. per quarter; in the other, that is in Lincolnshire, from 30lbs. up to 78lbs. That was a pit into which Mr. Shaw might very well drop (laughter). There were flocks of Southdowns on the Cotswold and in Yorkshire; but what was the comparative production? In the former case, the weight of a 20 months' sheep was 25lbs., in the other 50lbs., the animals being fed upon the same materials. The shorthorns, which had not been mentioned, were to be found from John o'Groat's to the Land's End.

The CHAIRMAN said he had understood Mr. Morton to say that he thought there was more in the animal than in the soil.

Mr. MORTON intimated assent.

Mr. AITCHESON believed that there was more in the adaptation of the soil to the animal than of the animal to the soil. With regard to cheese he knew there was what had been called cheesy land; but the explanation of that was that a piece of ground near the house had been pastured almost ever since the days of Adam.

Mr. RAMSAY felt it to be difficult, after the excellent remarks of Mr. Webster and the speakers who followed him, to make any novel observations. In his opinion Mr. Webster had treated the subject in a very lucid and masterly manner. In a style which reflected honour upon the club (cheers) he had pointed out the advantages attending an acquaintance with geological formations. He said that it was desirable for every man who was engaged in farming to obtain a knowledge of different strata, especially previous to buying land or taking a farm; that the coal formation, the sandstone formation, the clays—all had their peculiarities, and that if a geological map were examined it would be found that the surface almost invariably appertained, or bore some affinity to what was beneath. Mr. Morton differed from Mr. Webster, inasmuch as he thought sufficient allowance had not been made for the effect of washing; that washing would do away with the value of a knowledge of geology. In the case of the chalk formation, for example, it would, he doubted not, be found that the surface approximated to it; and if they went to the coal formation, the red sandstone, or the limestone, the result would be similar. The limestone when it lay near the surface produced sweet waters, and the grass was excellent for the feeding of sheep. Mr. Webster had established his proposition entirely to his (Mr. Ramsay's) satisfaction. A useful acquaintance with geology could not be gained without study and attention; but if the practical farmer would either apply himself to it, or have his sons taught to a certain extent, it would, in all probability, prove a source of profit. (Hear, hear). He differed from Mr. Morton entirely respecting animals. Animals fed on mountains, and called mountain sheep, having to travel a great deal for their food, must produce a great deal of bone and very little flesh in proportion. The effect of muscular action was uniform. If the Leicestershire sheep were removed to the Cheviot Hills, it was not to be expected that they would thrive to the same extent. He was decidedly of opinion that different soils were adapted to different breeds of sheep. He knew the analyses of soils were not generally speaking satisfactory, but still they must take the best means of ascertaining of what the soil was really composed. On that subject the difference between Mr. Webster and Mr. Morton was this:—The former pointed out the natural adaptation of soils for particular breeds of sheep, whereas the latter thought sheep could be fed as well in one county as in another, and cheese made as well; but then artificial means must be applied.

Mr. MORTON: No, no.

Mr. RAMSAY: Now, as to cheese-making, he thought

he knew something on that subject. To talk about the butter being taken from the milk was to wander from the question (Hear, hear). They must take the milk as it came from the cow, and then ascertain the purposes to which it was applicable. It was notorious that certain parts of the country produced very rich cheese, and it was also notorious that the best butter, that which was salted down, proceeded from very poor soils. The butter made on very rich land would not keep. The richer soils would not make such good butter as cheese; the butter made from them would not keep. It had been stated that, with a knowledge of geological formations, they might arrive at pretty correct conclusions with regard to the surface. No doubt much assistance might be thus obtained; but owing to convulsions which had taken place in a manner of which we had scarcely any conception, drifts had come in at intervals; and there was probably scarcely any district free from them; but that would not prevent a knowledge of geology from proving useful to the practical farmer.

Mr. AITCHESON said, having dug a good many pits, he had found that 100 feet below the surface there was no drift at all.

Mr. W. BENNETT felt quite incompetent to deal with the subject as he could desire, not having made it his study; but he was thankful to any one who endeavoured to throw such a light upon it as might enable them to farm more profitably—a point of very great importance in times like the present. For his own part, he felt much indebted to Mr. Webster for the able and lucid manner in which he had opened the discussion, though he doubted the practicability of coming to such certain conclusions as would justify any one in saying that he would ride through the country, and, by ascertaining the character of the strata below the surface, find out the quality of the soil upon the surface (Hear, hear). When he found so much difference in the course of his own farming operations, that, within the space of two or three hundred acres, different modes of cultivation must be adopted, he could not but consider Mr. Webster a little too sanguine (Hear, hear). A portion of land which he occupied consisted of a mixed soil, including a soapy substance, which was very profitable in farming; but on another part of the same farm, there was such a quantity of drift or gravel, that the cultivation was very far from being profitable. He had very little doubt that if he went deep enough to test the matter, he would find the same description of soil here as in the other part of the farm; but there was such an immense quantity of gravel accumulated there, that it rendered the strata below perfectly useless so far as farming purposes were concerned. Therefore it was easy for any one to be led away in such matters, and it was desirable, after all, that science should be received with great caution. A little practice was exceedingly useful to men in his department of life. He confessed he could not always tell why he could cultivate with confidence a certain crop in a certain field; but he knew that he might do so with safety. For instance, he knew that where there had been a good crop of clover, and sheep had

been fed off, he might rub on with confidence upon obtaining a good crop of wheat. There were other cases in which they might observe the operation of laws which they could not explain. He had often found the scientific man left quite in the lurch, and the practical one going a head of him, and over-distancing him (laughter). He made these observations in perfect good feeling towards his friend Mr. Webster. A very great mass of information, doubtless, existed on this subject; but still he considered practice to be before science, and had seen much error arising in many districts from men having professed to farm upon geological principles, without having based all upon practice. One word with regard to the question whether or not different descriptions of animals were peculiarly adapted to different descriptions of soils. He thought there was great truth in the observations of his friend Mr. Ramsay, who indeed always talked good sense; but he was of opinion that it was not fair to suppose that the whole difference arose from the soil. There was, in his opinion, a very great deal in the character of the animal placed upon the soil; and although he quite agreed that the fine rich soils of the country were more particularly adapted to the breeding of large animals, yet he also felt that animals which were very meagre and poor in a poor district would not fatten if removed to a better district. With regard to Suffolk horses, he did not at all agree with Mr. Shaw, that there was anything in the air of Suffolk to make it produce finer animals than were produced elsewhere. He had seen the Suffolk breed of horses sold for quite as high prices at a distance from that county as in the county itself. When a good breed of animals was put into the hands of skilful men in an entirely new neighbourhood, men who knew how to cross them and to preserve all their fine qualities, he did not think there would be much deterioration. As he had stated before, he did not profess to be able to throw any new light upon the subject; but he certainly fell in with the observations of their excellent Chairman, and thought that if in these flat and disastrous times they could find out any mode of giving a little more spirit to the farmers it was very desirable that they should do so (Hear, hear). But, really, geology was a very dry and cold subject under present circumstances (laughter). Though he had no doubt that it would prove valuable to agriculture; yet, under existing circumstances, farmers would have very little spirit for entering into such speculations (Hear, hear). It was a grievous thing to find that one was not compensated for one's exertions; and he was assured that this would prevent farmers from proceeding so far as they otherwise would do in the path of improvement. Some persons thought that as they could not improve prices they must seek to grow more corn. Now he would give an illustration of the fact that attempts of that kind was not always attended with the result expected, and beyond which cultivation could not be pushed. The circumstance which he was about to mention had reference to his own farm; but he believed he might safely assert that this year some of the best land in Cambridgeshire and Lincolnshire had produced the worst crops. In a certain part of his farm he applied

what was termed "Ramonneur soot," which was a very fine kind of soot, in great request. The crops were very splendid; but unfortunately it happened that they grew too rapidly, and the rain and wind beat them down. The result was that he had worse crops, in point both of yield and quality, than in other parts of his farm, which he had thought far less up to the mark (Hear, hear). Now when gentlemen told them that all they had to do in order to meet the reduced prices was to grow more per acre, he replied that they did not always tell the truth—that they shot beyond the mark on that subject. It was all very well to talk of improvement; but at the same time let those who did so concede to farmers the sines of war, which were the means of improvement (Hear, hear).

Mr. BAKER thought they had been travelling a little out of the road. The subject on the card was "the importance of some geological knowledge to the farmer," and he confessed he had felt surprised therefore at some of the observations of Mr. Bennett (Hear, hear). That gentleman seemed to have cast geology overboard, and to imagine that good sound practical farming could be carried on without any acquaintance with that science. Now he (Mr. Baker) had on a former occasion advocated that science as applicable particularly to farming; and he was still of opinion, and that opinion was strengthened every day he lived, that the more it was studied, the more it was pursued, the more it was investigated, the more conducive would it be found to the interests of the cultivators of land in general. A good geologist could tell, not only the nature of the soil, but the description of grass which it would produce, and having a botanical knowledge of the grass he would be able to say what was its specific character, and whether or not it was applicable to the making of butter or cheese, the feeding of sheep, and so on. That the soil exercised an influence upon animals appeared to him most certain, for they found particular districts in which fine animals were produced, and they knew by experience that if those animals were removed to another locality, they did not continue to be produced in the same perfection as in the locality to which they were naturally addicted. He would take the case of the Herefords. He had seen two or three experiments tried with regard to them, and the result showed, that when removed, however they might be kept up in quality they could not be kept up in size. He had had an opportunity of witnessing that, and he was quite sure there were gentlemen in that room who could bear similar testimony. He had seen similar experiments also with respect to Leicestershire sheep. When transplanted, although they were treated with all the care and attention which a good breeder could bestow upon them, they were almost valueless in point of size; or, at least, would not bear comparison with the animals in the county from whence they came (Hear, hear). They knew that Yorkshire was peculiar for its breed of horses, and that, owing as was believed to the soil on which they fed, they were bred there in a very superior way to what they could be anywhere else. How far that observation was applicable to Suffolk he did not know. He certainly did not

perceive much difference between the soil of Suffolk and that of Essex, or any reason why the same breed of horses should not flourish in the two counties. Still, he admitted, that in travelling in Suffolk there would be seen a much larger proportion of fine horses than beyond its bounds. At the exhibition of horses, which took place at Ipswich about a month ago, there was a collection of horses which all England might have been challenged to equal; and he ventured to say that Suffolk could produce at that moment finer teams of horses than any other county in the kingdom. He now came back to the question, how far a knowledge of geology was applicable to farming purposes? To him it appeared evident that the soil partook more or less of the character of the substrata beneath, and that certain soils were peculiarly adapted to the production of certain crops. They found that where carbonate of lime existed to a great extent the soil was especially adapted to the growth of wheat and barley, and no soil could be very productive of such crops unless carbonate of lime either existed naturally or could be added in sufficient quantity. In the whole of Essex, and in the locality round London for a certain distance, they found that wheat could not be grown on clay without the assistance of chalk, which surrounded it in abundance in every direction. By the addition of chalk to the London clay a large production of wheat could be secured. He believed the case was very much the same in the other counties of England. There were some districts in which too much lime prevailed; there were very few districts in which the addition of carbonate of lime, in smaller or larger quantities, would not prove beneficial. There was one point with regard to lime which was not perhaps generally known, namely, that the constituent properties of lime did not differ from those of chalk; the only difference, that in the burning carbonic gas was thrown off, and the fine manipulation of the particles which took place caused the plants to take up the lime easily. The application of lime instead of chalk in his district was owing to this cause—the carriage of chalk in sufficient quantities would involve a very large expense, as the distance which it had to be conveyed was considerable. The carting of 15 or 16 tons of chalk per acre would be a very expensive process. It was found, however, that three or four tons of lime would produce the same effect, and lime was adopted, not because it was more beneficial in its properties than chalk, but because it was quicker in its action, and less expensive to carry. It was very desirable to ascertain how far lime is applicable to the production of crops. He wished to confine his observations to the applicability of geology to farming purposes, and to abstain from introducing any which do not bear upon that point; and he could not but say that to have a thorough knowledge of the soil on which you are farming, of its powers of production and of its defects, and to know also what soil or what inorganic substances could be beneficially added to it, must, as it appeared to him, prove extremely advantageous, and show that geology was of use to the farmer. (Hear, hear.) A geologist could hardly be supposed to be only a geologist; he must have become partially a chemist, and having investigated the rocks which were exposed to his view he must know their constituent qualities, and know how to manage them, and how to apply them beneficially in farming operations. No person could study geology without studying chemistry at the same time, and therefore he thought that a knowledge of the science was calculated to be exceedingly beneficial. As regarded grasses, he had no doubt but a particular description of rocks was adapted to the production of a particular kind of grass. Some years ago he was induced to make some experiments on that subject, and the result illustrated the truth of what he was now saying. He was desirous of

introducing into his garden a complete collection of all the English grasses; and being at that time in the habit of visiting different parts of the kingdom he had good opportunities for carrying out his design. He transplanted all that he could collect; and what was the result?—A very small proportion vegetated, a much larger proportion died away or did not come to perfection. He found it impossible to grow grasses which were indigenous to chalk upon a sandy soil; if he had brought chalk to the ground he might perhaps have succeeded. So again all those which grew naturally upon clay would not grow upon a light soil; and consequently wherever may-weed, the wild tare, or the white charlock was found, their presence denoted that there was required an application of chalk. The knowledge of this might prove useful to many. It was important to remember that may-weed was never found upon carbonate of lime. If a sufficient quantity of lime were added to the soil on which it grew it destroyed them, and this showed that a proper admixture of soils and other substances would effect the farmer's object. He had a piece of land under his eye upon which the white charlock grew for centuries to such an extent that it was scarcely worth cultivation. The application of 40 or 50 loads of lime entirely removed the evil. So far he had made a few general observations, and had given a few facts and comparisons, for the purpose of shewing how some knowledge of geology might be rendered advantageous to the farmer in the cultivation of his land. But there was one point which he had not touched upon, namely, the applicability of the science to the purposes of draining. Now he felt quite satisfied that no person, whether he might call himself practical or theoretical, could tell how to drain a district of land without some knowledge of the direction of the strata. So satisfied was he of this, that, at the period of life at which he had arrived, he would never think of attempting to effect the object if he had not some knowledge of the science of geology—knowledge which he had acquired by devoting a considerable space of time to its study. In all soils there was a stratification, the layers being formed in a certain succession. The main divisions, as had been explained by Mr. Webster, would be found lying in a regular series. If he were to examine the district in which he lived he would find an admixture of soil resting upon the London clay; then beneath the London clay, white chalk clay, what was called plastic clay; then there was the chalk in Cambridgeshire; then the solid formation in Huntingdonshire and in Bedfordshire; and so, proceeding throughout the kingdom, all the various strata, from north east to south west, would be found lying in regular succession. That applied to the great general divisions; but in all their respective localities there were other formations, what were called subsequent formations, which had been produced by the action of water at a later period. They found no vestige of chalk below the tertiary formation. That seemed to have been one of the principal formations, and consequently they found it extending from the south west to the north east. The nature of the formation was supposed to be owing to some great disruption, in which the salt had forced its way downwards. Chalk formed one of the great divisions. On the surface of the chalk were signs of a great disruption, in which the action of water was very powerful. On the surface of the London clay were beds of gravel 30 or 40 feet in thickness, resting, as it were, in basins of London clay. In that gravel they found the loam or clay which had been forced up. He had seen an instance of the London clay being forced directly up through a bed of gravel 70 feet in thickness. All the various strata at one time lay parallel, forming what in draining phraseology was termed a level. Owing to the convulsion of which he had spoken nearly all the strata had run

adrift. He then illustrated upon a geological map the assistance which a knowledge of the science of geology would afford to the farmer in draining operations, shewing that it would tell him how to proceed with the greatest economy and the nearest approach to certainty. In conclusion he observed that a knowledge of geology was absolutely necessary for the proper management of farms, and especially of those farms which required draining; that some degree of knowledge might be attained by every one; and that whoever made the attempt to acquire it would find the study so delightful that he would pursue it to an extent which would make it profitable not only to himself but to the neighbourhood in which he resided. The more he investigated the science the more advantageous would he find it; and, however great any one's practical ability might be, whatever skill he might have exhibited in farming his land, if he applied this science to his farming, he would not only become a better farmer, but would be better able to meet those difficulties which Mr. Bennett had so well pointed out. (Hear, hear.)

Mr. W. F. HOBBS thought the club had been very fortunate in the selection of so valuable a subject for discussion; for although the month was not one in which a numerous meeting was expected, every one must admit that there had not been a more interesting discussion for a long period. He fully concurred with Mr. Ramsay as to the excellent manner in which the subject had been introduced; and although he could not go the length of saying that every person having a geological map might ascertain the character of the soil on his farm, still he thought Mr. Webster's remarks on the whole had a greater bearing on the interests of practical farmers than those of Mr. Morton (Hear, hear). He quite agreed with Mr. Baker, that some knowledge of the science of geology was necessary for every man who called himself a practical farmer, and who wished to extract from the soil what it was really capable of producing. He was quite satisfied that no man could direct draining operations, more especially in the case of deep drainage, unless he had some acquaintance with geology (Hear, hear). There was a great deal of land in his own immediate neighbourhood to which that observation forcibly applied. Mr. Webster knew very well that in the case of bogs and springs, when the draining was conducted by a man who had devoted his life to the study of geology, there was a great saving of capital and labour. Nature had given them lessons, the learning and following of which would be of very great service to them. Many of them, no doubt, recollected the excellent lecture given, by Professor Way, a few months ago before the Royal Agricultural Society. In that lecture the Professor showed that there were soils which contained no clay; that where there was no clay mixed with the sand the water percolated through the vegetable and mineral matters, and the soil was deprived of most important properties; whereas if a portion of clay were mixed with sandy soils, the water passed off in a pure state, and all the valuable substances were retained. He felt much interested in that statement, and he had carried out experiments to a considerable extent. He felt persuaded that the clay which was met with on the sides of hills might be advantageously employed on bogs; and he knew not how a tenant farmer who had a lease could do better than lay out from £3 to £5 per acre in

making such an admixture. He had this year expended £800 in the application of chalks to sand and gravels; and when asked why he had done so, he replied that a relative had made a similar application forty years ago, and that he did not think he could err in following a plan which had succeeded, and was succeeding all round his neighbourhood. Neither farmers nor landlords knew enough respecting what was beneath the soil, and might be rendered available in its cultivation. It would be an advantage to the agricultural interest if an instrument were invented, by means of which they could more easily ascertain the character of the substrata, than by digging down as they were accustomed to do at present. Were such an instrument invented, they might perhaps be able to discover in a few hours, whether or not they had clay and other substances which might be advantageously applied to the surface. The subject was altogether an extremely interesting one, and, as during the next month it would be the duty of the committee to select subjects of discussion for the ensuing year, he would urge upon those who were anxious for the prosperity of the club to lend it their support by proposing topics of interest, as well as generally to sustain it by means of their presence and influence. Mr. Shaw had alluded to him in connection with the Suffolk horse. On that subject he must declare his belief that very much depended upon the soil on which the animal was produced. (Hear, hear.) He agreed in the main with Mr. Shaw, that no part of England produced horses of the same general character, of such hardy habits and stamina, as the district of East Suffolk. He had known horses to be purchased in East Suffolk, compact in form, wiry, and clean-legged, measuring about 15·2, and then taken into Gloucestershire to breed. In two generations they had *increased* two inches in size. Mr. Shaw knew that he referred to the neighbourhood of the Mendip Hills. With regard to the Southdown sheep he would only observe that when fed upon the Fens they would come up to 20 lbs., 30 lbs., and even 34 lbs. per quarter, whereas when fed upon the Southdowns they did not exceed from 16 lbs. to 20 lbs. There was a general fact, which proved that soil had a great deal to do with the character of animals.

The CHAIRMAN observed that for many years he was in the habit of going down to Wilton Fair, and there buying two or three hundred Southdowns to feed on fat land. He found that although the land was worth far more per acre than that which they came from, he never could feed them. The moment the lambs were gone improvement was at an end. Whether this was owing to the strength of the food he could not tell, but the loss was very considerable.

Mr. WEBSTER then replied. He said he was very glad to find that the tenour of the discussion had borne him out in his introductory observations. He might have prepared a learned paper on the subject; but he thought it better to make a few practical remarks, and to show concisely what, in his opinion, were the substantial benefits to be derived from the study of geology

(Hear, hear). He did not agree with Mr. Morton that all the geological formations of England were covered with drift. If they went ten miles from London, for example, they would find a decided clay. There were, in fact, large quantities of land where there was no drift whatever. Many persons, proceeding from different parts of the country, for instance, where the lias clay abounded, were astonished to find the rich grass-lands in the neighbourhood of London letting for 30s. per acre. They were not aware that the London clay was so deficient in lime that it would not fatten animals. With regard to soils and animals, as so much had been said on the subject, he would not take up their time by any lengthened additional remarks. He must, however, remark that all soils produced a particular description of grass, and if on the following morning he were to proceed to any part of the country he would be able to declare what particular grasses the formations which he met with would produce most readily. If they went to Scotland, persons who were in the habit of purchasing horses would tell them that a particular part of the country was favourable to the production of a particular breed; and on looking at the map, and making comparisons on the subject, he found a constant connection between the breed and the geological formation. So also in Ireland; the best breed of horses was produced in a particular locality, and when he came to investigate the locality he found it upon a particular formation. So, also, he expected that whatever parts of the country he might visit he would find that on particular soils was produced good cheese; and what he wanted to impress upon the agriculturist was this, that if he wished to have a good dairy, geology would tell him those parts of the country in which he was most likely to obtain it. In whatever locality a farmer might be stationed, geo-

logy would give him information which he might turn to profitable account. Mr. Bennett would be astonished, perhaps, to hear that from a clay in his own district a beautiful oil had been extracted, and that the clay was afterwards used as manure. Some years ago a paper was published by Mr. Pusey, in which he mentioned the fact that Sleaford Heath, on the road to Lincoln, had formerly been one of the poorest parts of the country, sign posts having been erected upon it to show the traveller how to proceed in his journey; but that at a comparatively trifling expense, that had since been rendered one of the best cultivated parts of the country. In all such cases a knowledge of geology must prove exceedingly beneficial. He concluded by expressing a hope that at some future time the subject would be resumed, and suggesting that if it were, one particular formation should be selected for discussion.

Mr. MORTON observed that he was digging the London clay at that moment, seven miles from London on the south and fourteen on the north, and there he found beds of flinty gravel after the chalk had been washed down and deposited where the water rose.

On the motion of Mr. Shaw, seconded by Mr. Morton, it was unanimously resolved, "That a knowledge of geology is of importance to the farmer."

Mr. J. C. NESBIT proposed a vote of thanks to Mr. Webster, as the introducer of the subject. He regretted that he had been unable to attend and take part in the discussion. He was persuaded that a knowledge of geology was not only important, but of paramount importance to the farmer.

The motion was seconded and carried.

On the motion of Mr. Shaw, a vote of thanks was given to the chairman, which terminated the proceedings.

CUTTING STRAW FOR CATTLE.

Farming, as yet, is in its infancy. The farmer is just beginning to see that something must be done to meet the exigency of the times; the woeful alteration in which has been brought about by the free-trade policy. If they have been thrown down on their backs it is not the disposition of a farmer to lie there expecting someone to help him up, but he jumps up and at it again. As a class, they are not to be excelled for grumbling and fault-finding; but then, willing they are to conform to the wishes of their rulers, and hence the farmer is generally found ready to perform his part truly and well in the national drama.

Chopped straw, in some of its combinations, is now beginning to be found the best and most economical food that can be used for the cattle on a farm, and by which the largest number of animals may be kept on a given quantity of food. It is greatly to be wondered at that the chopping and

cooking system does not make more headway than what it really does, when we consider the advantages to be derived from it. But many farmers are apt to look on anything modern with an air of distrust, and are afraid to try the experiment; time, however, changes all things, and we hope to see the day when the farmer will have all the food cooked for his stock, for the same reason that he now cooks his own. Many intelligent farmers are already beginning to acknowledge the benefits of this method of treating the food of their fattening cattle, and say that the stock thrives on it and gain more weight in a given time, with the same quantity of food, than they do by the ordinary method. If such is really the case, that fattening cattle do so remarkably well on it, the lean stock must do the same. The point chiefly to be considered, then, is the labour in boiling and preparing the food in the proper manner. A man

will cook food sufficient for 24 head of cattle for one day in six hours, the chopping being merely a secondary consideration where steam power is employed. The best method of cooking is that where steam is used for heating the receptacle in which the food to be cooked is placed, as it prevents the possibility of the food getting in any degree *pan burnt*, or "set on." The steam is supplied from a boiler, similar to that of a steam engine, by a pipe, and traverses round the pans in which the food is placed. These pans are made the one within the other; the steam enters betwixt them and fills the space, thus heating the whole regularly and speedily without fear of burning the food. The outer pan has a hole in the bottom, furnished with a stop-cock, so that the condensed steam can be let out or retained at pleasure. The whole is exceedingly simple, and can be worked almost by a child without fear of accident. The animal, when its food is chopped and cooked in this manner, has not to spend half its time in masticating tough straws, but it can fill itself sufficiently in a short space of time, and then lie down to rest, and digest the food swallowed. The manure dropped is also greater in value than by the other method, and the whole will amply repay the farmer for the additional expense incurred in preparing the food. What is good for one must be good for many; if the cutting of food be good for cattle, it must, and is acknowledged to be, for horses (for draught horses especially), as they sooner fill themselves on chop, than having to pull their provender from the rack; the whole is also clean eaten up: there is no waste as there is when the food is uncut. Whoever will take the trouble to try the experiment will find that, out of the uncut hay or clover given to a horse, one-fifth, at the very least, is wasted, and the animal not doing so well. It is the opinion of some, that, if the whole of the straw and hay grown on the farm, with just sufficient of the former preserved for thatching, were converted into chaff, the improved condition of the manure would amply repay for the additional expense in cutting it, and with great show of probability, besides keeping double the quantity of stock. If we take the trouble to examine the farm-yards where the straw is uncut, we shall find the litter which has been deposited in it to be saturated with wet, and mixed with a very small portion of dung dropped by the animals; and that is all: it is in alternate layers of red and black, as the straw given out has been oats or barley. No person would suppose, for a moment, that it is fit to put on the land in this state, so it is carted into a heap to decompose—in the act of decomposition throwing off a large quantity of am-

monia and valuable gases which would be incomparably better retained. When it is distributed over the land, after being fermented, there is very often a great deal left uncovered and exposed to the action of the wind and sun, which extracts the few remaining particles of goodness out of it, so that nothing remains which will in the least contribute to the building up the structures of the succeeding crop.

Compare, now, the chopping of the straw with this. The straw can be cut for a very little additional expense, by means of a straw-cutter attached to the thrashing machine, which takes it when released from the latter, and reduces it to the lengths required—3-in. for bedding, 1½-in. for food; this may be done by attaching an extra horse to the thrashing machine, should the farmer not have steam power at his command, and should his farm be too small to warrant the expenditure of so much money as a good steam-engine will cost. The same number of hands will do to work the machine as did in the ordinary method; for the man, or men, who removed the uncut straw will remove it when reduced to the lengths required. The stock may be greatly increased, because they will eat up almost every particle that is given to them, and thrive better on it too; the bedding gathers up and retains the urine and dung, and one-half the quantity of straw does for bedding when reduced to lengths of two or three inches compared with what is given them in the state it comes from the thrashing machine, leaving the rest for food. Every straw is rendered equally beneficial, and an air of tidiness is given to the whole of the farmstead, instead of having straws scattered about in all directions, and blowing all ways on a windy day, giving an idea of slovenliness to the whole building, which is very disagreeable. If anyone will examine the manure of a fold-yard where the straw is all cut, he will find it of a quite different appearance to one where it is thrown out in its unchopped state. There is no need to remove manure out of the farm-yard until it is required to be laid on the land, thus saving the labour of loading and unloading. It can be drilled on the land with turnips in the greatest regularity by the aid of the manure drill now in common use, and by which the quantity to be laid on is determined with the greatest regularity; and, by being reduced into so much smaller particles by chopping, it more easily combines with the soil, without having to undergo the wasteful process of extreme fermentation in a large heap.

HORDEUM.

Oct. 28, 1850.

—Gardeners' and Farmers' Journal.

NORTH LONSDALE AGRICULTURAL SOCIETY.

At a meeting of this society held on the 22nd of October last, the following report was read:—

PRIZES AND INSPECTORS' REPORT.

My Lords and Gentlemen,

In making our report of the awards for the various prizes offered by this society, for the cultivation and general management of farms, we beg to accompany it with a few observations stating the reasons for our decisions.

We do not expect that these reasons will satisfy every competitor in every case, for we can assure you that the competition for some of the prizes was so close that we found it no easy task to satisfy ourselves. Be this as it may, we hope that you will at least give us credit for good intentions, whenever our judgment is called in question.

Premium 45, for draining.—We have awarded this to Mr. Robert Bibby, of Old Park, who, on a farm of 207 acres, has drained in a complete and permanent manner with tiles 34 acres. The soil is peaty, with clay underneath. He has cut about 1,875 roods of drains, of a depth varying from 3 to 4 feet, using 37,500 tiles and 30 tons of slate slabs. The cost was as follows:—

Tiles, 37,500	£46 17 6
Slabs, 30 tons	16 10 0
Labour	31 16 1½
Team work.	12 4 6
Nine grates for drain mouths	0 6 0

Total. £107 14 1½

For this premium there was no other competitor.

Premiums 46 and 47, for turnips and mangold wurzel.—We have awarded the first prize for turnips to Mr. Ashburner, of Scales. He has not only the heaviest crop, but they are of remarkably fine quality, and thoroughly clean; the rows a yard apart. For the second there were three competitors, so nearly equal that we could not feel justified in giving the prize to any of them without mentioning it. They are Richard Simpson, Joseph Fox, and George B. Ashburner. Those of Simpson we consider, if anything, the heaviest crop; but they are of a coarser quality than the others, with strong fibrous roots; his land is certainly somewhat inferior, and we beg therefore to suggest to the committee to divide the prize, giving £1 to Mr. Simpson, and 10s. to each of the others. Mr. John Butter, of Moorside, another of the competitors, has a crop equal to any of them, when the quality of the land is considered; but we scarcely

think him eligible, for reasons which we will state when we come to speak of his farm. For this premium there were 8 competitors, nearly all possessing beautifully clean good crops, and still growing. All the best crops were manured with both farm-yard manure and guano.

Premiums 48 and 49, for the best crops of mangold wurzel.—The first prize we have awarded to Mr. James Robinson, of Lane House, who is the only eligible competitor. We have made no decision of the second prize. Mr. Dickenson is the only competitor, and we do not consider him entitled to it, from not having the number of acres required by the scale, which, we take the liberty of remarking, is fixed far too high. Both of these are fair crops, nearly equal, and thoroughly clean, but not heavy; indeed, we saw no heavy crops of this root during our survey.

Premiums 50 and 51, for the best managed farm.—For these premiums there were six competitors, including a great variety of soil and situation, and none of them without some claims on our notice. In awarding the prizes we have not selected those farms which, from being more favoured by nature than the others, in respect to soil, situation, or compactness, wear a more pleasing appearance to the eye of the observer, though there is, unquestionably, great merit in the management of some of this description; we feel more pleasure in rewarding merit which has to contend with difficulties of no ordinary character, and which require to be met by constant watchfulness, energy, and patient labour, in order to be overcome. The first prize we awarded to Mr. John Bibby, of High Frith, whose farm we found in excellent order; the water-courses, which extended through the whole farm, well cleaned out, the fences kept low, and neatly trimmed, and the land altogether in a high state of cultivation. He occupies 300 acres, nearly the whole of which is moss land, reclaimed from peat bog, and cultivated as nearly as possible on the system of alternate white and green crops. The least pleasing object that we noticed on Mr. Bibby's farm was, that a portion of his stubble was not so clean as could be desired, but this we consider a trifle when the general management of such a farm in such a situation is considered. He keeps 8 horses, and has at present 60 cattle and 129 sheep. He milks in the summer regularly upwards of 20 cows, from the produce of which a large quantity of the finest cheese is made; and among the many instances of female thrift and management which

we noticed, the dairy of Mrs. Bibby deserves especial mention. The remainder of Mr. Bibby's stock consists of young cattle reared on the farm, and they are all in fine thriving condition. The second prize we award to Mr. John Butler, of Moor Side, so far as regards the management of his arable land, of which he occupies 40 acres, the whole of which is admirably clean, neat, and cropped alternately with white and green crops. But besides this he occupies upwards of 40 acres of moor land, which is capable of being vastly improved, and at which he has hitherto done nothing. Mr. Butler has entered for premiums before, and last year carried off the second for farm management, this moor land having apparently escaped the notice of the inspectors. The situation is high and bleak, but the soil is of fair quality, and a great part of it is covered with furze; yet on looking over the boundary wall we saw land of the same quality on which his neighbour Mr. Ashburner, of Ireleth, has for a number of years been growing excellent crops of hay, oats, and turnips. We leave it to the committee to decide whether this moor land should not be included with the rest of Mr. Butler's farm; for we certainly think it should; if such be their opinion we consider him not eligible for this prize which we then award to Mr. James Robinson, of Lane House. This is the reason which induced us to pass over Mr. Butler's turnips; for with his moor land he has not a sufficient number of acres of turnips to entitle him to compete. Mr. Robinson's farm we consider admirably managed so far as regards cleanliness and neatness; but we could not help remarking that, considering the situation so near the town, some of it, the green crop especially, showed a want of manure. Mr. Robinson scarcely ever buys manure of any kind; his principle is to raise all he requires on his own farm; he keeps a large stock of cattle and sheep, and buys annually about four tons of oilcake and four quarters of linseed. This certainly will greatly enrich his manure, and enable him to make an increased quantity; but we still think his crops would be improved by a more liberal supply. The size of his farm is about 105 acres, the soil rather light and gravelly. He has about 35 acres of old pasture; the rest is arable, and cropped alternately with white and green crops, but suffered to remain two or three years in grass in every course. We were much pleased with his stock of cattle and sheep, and complimented him on his skill and success as a breeder of thorough-bred animals, but this we do not consider an essential part of farm management, and it certainly is not the object for which these prizes are given. Amongst the competitors for these prizes is Mr. R. W. Ashburner, of Ireleth, who led us a race of several miles along

narrow and dirty roads in looking over his farm. The greater part of his property consists of small enclosures, intermixed among others belonging to his neighbours, at considerable distances from home and from each other, and to our minds quite unsuitable to any other mode of management than that which he adopts, viz., that of keeping the greater portion of it for grazing. His management of grass land is different from that of every other person we have visited, and we consider it superior; and the strange difference that exists in almost every instance between his fields and those of his neighbours immediately adjoining, is a sight worth looking at. The fields are all well-drained, some of them at considerable expense, and the herbage is sound and good, while in many instances the next field is covered with coarse grass, weeds, and rushes. His main secret is in never eating his land bare, always taking care to leave a covering in winter; by this means he secures a good bite of grass earlier in the spring, and a more luxuriant growth during summer, than any other man in the neighbourhood. His estate consists of 110 acres, of which 20 are under the plough, 40 in pasture, and 50 mown. Of these 50, the produce of 36 acres is sold annually on the ground, and a large quantity of manure, principally guano, is purchased in return. This is a system which very few men in this country could profitably adopt, and which, certainly, no tenant farmer is allowed to follow; and it is for this reason, coupled with the fact of Mr. Ashburner having no landlord, that we feel ourselves justified in withholding from him a premium, especially as there are tenant farmers competing with him, whose management of land in the regular course of husbandry is equal to his own. The other competitors for these prizes are Mr. Robert Bibby, of Old Park, and Mr. John Backhouse, of Langlands. Mr. Bibby's land is principally low laying moss land, and is well-managed in a four-course husbandry. Mr. Backhouse occupies a remarkably neat and compact farm; the soil is mostly dry and gravelly, and it is well cultivated. More than half of the land is in grass, and Mr. Backhouse feeds annually a great number of cattle and sheep.

Premium 52.—For consuming by sheep the largest quantity of turnips on the ground whereon grown. For this premium there are two competitors. We have awarded the prize to Mr. William Postlethwaite, of Stank, who purposes consuming $15\frac{1}{2}$ acres on a farm of 147 acres. These are an excellent crop, and thoroughly clean, as are likewise those of the other competitor, Mr. Thomas Teasdale, of Gascow.

Premium 53.—For consuming by sheep the largest quantity of rape on the ground whereon

grown. We have awarded the premium to Mr. John Backhouse, of Longlands, whose field of rape, about 10 acres, is without exception the finest we ever saw. It is sown broadcast. Another competitor, Mr. J. B. Storey, of Mearhouse, has a greater breadth in proportion to the size of his farm, but it would require nearly two acres of his to equal one of Mr. Backhouse's; and, since we conceive the object of the society in giving these premiums is to encourage superior cultivation rather than extent of crop, we have decided accordingly. Besides, there were three other competitors, viz., Mr. G. B. Ashburner, of Elliscoles, Mr. Richard Simpson, of Great Urswick, and Mr. Thomas Teasdale, of Gascow, all of whose crops are good, thoroughly clean, and sown in rows of about thirty inches apart. We have some doubts of the propriety of this system where the land is free from weeds, and in the same condition that Mr. Backhouse's evidently is.

We hoped to have had the satisfaction of deciding a match which had been made between Mr. R. W. Ashburner, of Ireleth, and Mr. Robert Robinson, of Ulverston, as to which could show the best half acre of turnips; but Mr. Robinson said he gave in, in order to save us trouble, consequently we declare Mr. Ashburner to be the winner.

In concluding our remarks on the farms, we beg to state, as a proof of the progress that the green crop husbandry is making, that of the six farms which were entered for the prizes for general management, only one had bare fallow upon it, and this the occupier declared was not his usual course, and he gave us satisfactory reasons for adopting it in this instance. We do not mean to infer that bare fallows are entirely useless under all circumstances, still we think they may to a great extent be dispensed with.

Cottage Gardens.—The giving of rewards for the cultivation of cottage gardens was rather lightly treated when it was first proposed in this society; but we think that these prizes will be the means of effecting great improvement in that respect; and any one has only to take a walk through the garden allotments of this town to be convinced how much

improvement is to be desired. It is pleasing to behold the care and skill with which some of these plots are cultivated, and the luxuriant crops which care and skill will produce; and it is equally painful to notice the gross neglect with which others are treated, with perhaps only a footpath between the two. By giving a taste for gardening to the labourer and artizan, and furnishing them with the means of gratifying it, we give them a surer means of procuring the necessities of life, and a pleasant occupation for leisure hours. We hope also that it will be the means of effecting great improvement in their habits and morals, making them more thoughtful, sober, and industrious; and giving to each of them cheerfulness, contentment, and a happy home. In this respect we think our worthy member, Mr. Heywood, has made a move in the right direction, and we hope that these prizes will be continued. We are not sure that in giving the prizes we have done justice to all the candidates, as none of us consider ourselves proper judges of garden cultivation, and the season is too far advanced for any one to form a correct opinion; but as there are eleven prizes and only eight entries, we have the satisfaction of awarding a prize to each candidate.

We award the first to William Geldart, Ulverston; second, John Coward, Ireleth; third, Thomas Redhead, Ulverston; fourth, John Lawrence, Ulverston; fifth, William Simpson, Ulverston; sixth, Isaac Harrison, Ulverston; seventh, Thomas Speight, Ulverston; eighth, George Nicholson, Hawkshead. We have now the pleasing duty of returning our most grateful acknowledgments for the kind and hospitable manner in which we were received during our tour of inspection. We hope that those who have been unsuccessful will not be disheartened, but manfully struggle on in the race of improvement.

We have the honour to be,

My Lord and Gentlemen,

Your obedient servants,

(Signed)

JOHN CASE, Jun.

WILLIAM ROSS.

ROBERT BARBER.

THE BEST AND MOST ECONOMICAL APPLICATION OF LIQUID MANURE.

Our own opinions on the proper mode of applying liquid manure are too familiar to our readers to need any repetition from us.

The power of soil to detain quantities of manure too great to be applied to any land, has settled in theory what practice before had established, that the best and most economical application of liquid

manure, at least as it ordinarily presented itself in farm steadings, was to absorb it with some mass of soil, and so deal it out to the land in that degree of fixation which nature herself has provided. The practice adopted on a farm in Scotland appears to be the very reverse of this, and, as it is described, to convert the *whole of the manure into liquid*, or

as far as practicable, and then to distribute it by a force-pump, worked by the steam-engine.

This farm is that of Myremill, N.B., and the peculiarities of its management are described; but they are spoken of rather as possibilities which may succeed than with any positive proof that success has already been attained. Mr. Cunningham thus describes the appliance, and his suggestions for its improvement:—

“The collection of the liquid manure in tanks is indispensable, and these I would recommend to be built of a circular form, instead of an oblong square, as at Myremill, and lined with brick, and coated with cement. This form gives the largest area, at least expense of walls; and, further, should the new mode of distributing the liquid manure be adopted, by means of forcing pumps and pipes, it is indispensable that an apparatus be applied to stir up the more solid parts, so as to send forth, in an equal form, the entire contents through the pipes, and the circular form being the most suitable for effecting this by the aid of machinery. A supply of water is also required to give the animals, washing out troughs, and flushing the gutters, and to dilute the manure, all of which should be conducted by pipes into the troughs and tanks. The question of converting the whole manure of the farm into a liquid state may not receive the sanction and approval of many agriculturists: of its efficiency applied in this form I cannot give an opinion, and as the mode has only recently been adopted in this country, it would be hazardous to pronounce upon its utility. I have made a calculation of the expense, and if other points are as satisfactory, I doubt not but it will one day be generally adopted. In order to bring the matter of expense to a test, we will suppose a farm of 400 acres, and 100 acres of this in root crops, and supposing 70 acres of these consumed in the offices, and 25 tons per acre as a medium crop, gives

50 acres of Italian ryegrass, cut thrice, 20 tons per acre	1750 tons.
200 acres of corn, straw of do., 1½ ton per acre	1000 ”
And an addition of one-third at least of water, equal to	300 ”
	1000 ”
Say	4000 ”

Now this may be all sent through pipes by means of the steam-engine working five hours in the week upon an average for fifty-two weeks—260 hours.

The engine power I estimate at 2s. per hour	£26
Four men employed, say 3d. per hour	13
Interest on pipes, and tear and wear ..	30
„ on tanks, say	6

£75

Compare this with the filling, carting to the fields,

turning, filling, and carting out again, and spreading of say 3,000 tons—1,000 tons may be assumed to be lost by evaporation—I think it would not be over-estimating if I put it down at 1s. per ton. This is exactly double, £150. There is another consideration, and not the least important: by getting the manure applied in this manner, it lessens the amount of labour in May and June, when the turnip crops are being got in, and which is generally the season of greatest exertion to get finished in time. Any arrangement that can tend to equalize the labour of the farm would unquestionably be a decided advantage.”

Now we cannot help perceiving two practical difficulties here; and the first is, how is the whole mass of the farm produce to be reduced to liquid, or rendered, in short, in so liqueform a state as to be capable of being pumped? We may imagine the great bulk of the root crops and Italian ryegrass converted into liquid, and pumped away; but by what process 300 tons of straw are to be converted into a form so liquid as to be pumped, we are utterly at a loss to imagine!

Again, in estimating the cost of pumping, &c., he sets it against carting and distributing; but he has failed to tell us how it is to be distributed over the fields. Is it to be conveyed by pipes, or carted, or drilled? That it cannot be by pipes is pretty clear, for the interest of the entire system of pipes is only taken at £30, including wear and tear. Now we know not how large a proportion is allowed for the last item; but if it did not occur at all, the sum for the cost of pipes could not be more than £600, at five per cent. Now, we believe the cost of the smallest available pipe would be at least one shilling and sixpence per yard, so that the entire piping he would have at his disposal would be only 8,000 yards for a 400 acre farm—quite inadequate to any distribution over the entire surface, not to mention the difficulties and cost of laying the pipes.

As, therefore, it is impossible to convey the water to fields where it is wanted, and there to distribute it over the land, we do not see why the mere cost of pumping alone is debited against the carting and spreading of the solid manure.

And we would ask why be at the expense of carting so much water? Of the quantity distributed 1,000 tons are admitted to be mere water, and of the root crops the manure is assumed to be 1750 tons. Now, as every 100 parts of this root crop will contain 90 parts of water, we shall have in the 1,750 tons 1,575 tons of water, or an aggregate of 2,575 tons of water to convey to the soil at a cost of sixpence per ton! And as the real manurial elements are a very small proportion of the whole mass, it does appear that *the water* is a costly vehicle for conveying it to the soil.

Why, we would ask, might not a mass of ditch scourings, pond clearings, hedge banks, road scrapings, &c., be collected, and mixed, if necessary, with clay, and this saturated over and over with the liquid until it assumes a strength almost equal to guano. In this concentrated form it may be carted and spread at a very trifling cost, because of its condensed form, and the 4,000 tons credited to the manure may, exclusive of the 300 tons of solid strawy matter, be represented by possibly 300 tons more of the compost. Take the 600 tons at the extreme price, or 1s. per ton, for carting up the compost, filling, turning, and spreading, it will reduce the cost of the solid manure as against the liquid to £30 per annum—a much more reasonable sum than £150, which is very exorbitant, and one should imagine rarely spent for such a purpose.

While we are on the subject of liquid manure, we

cannot help naming a system pursued in some places with decided advantage—that of having *no liquid manure at all*. The buildings being all spouted, no more rain falls in the fold yards than comes directly from the heavens; and this is pumped upon the solid manure as the tanks fill; nor does the proprietor ever find too much liquid manure, nor any necessity to cart it away; indeed, he urges that it is a deterioration and loss to the solid manure to cart away the liquid, which no subsequent application of it directly, can compensate for.

That the manure will reabsorb a very large quantity there can be no doubt, and whatever may be said on the advantage of direct applications, there can be no doubt that the liquid manure must be absorbed in some form to be of the greatest use in the farm.—Gardeners' and Farmers' Journal.

TRAFALGAR SHOW AND AGRICULTURAL MEETING.

The annual meeting of the Trafalgar Agricultural Society took place on Monday, Oct. 21st. The show of cattle was scarcely an average one in point of numbers, but the horses were more numerous than on any previous occasion. The sales which subsequently took place brought rather low prices.

After the show and sale, about forty gentlemen sat down to dinner in the Trafalgar Inn, Mr. Dunn in the chair, supported by John Kinnear, yr., of Kinloch, Esq., and Mr. Russell, secretary to the society, whilst Bailie John Mitchell, of Cupar, and Mr. Hope Pitcairn, Mount, officiated as croupiers.

After the customary loyal toasts had been drunk with the usual enthusiasm,

The CHAIRMAN gave the toast of the evening, "Success to the Trafalgar Agricultural Society;" after which he gave the "New Committee," coupled with the name of their new and distinguished president, Mr. Kinnear, yr., of Kinloch.

Mr. KINNEAR said: On behalf of those whose names have been coupled with mine in the toast you have just drunk, as well as for myself, I beg to offer you our sincere and hearty thanks for the honour you have done us; and for myself I have further to thank you for the distinguished honour you have conferred upon me in electing me to fill the office of preses of this society for the ensuing year. Had I consulted my own inclination solely, I should, indeed, have declined to undertake the duties of that post, feeling that they would be much better provided for by the selection of some one of greater ability and experience in the performance of such functions than myself. But since it is your wish that I should, nevertheless, allow myself to be placed in that position, I will not refuse to occupy it, and will trust to your kindness to overlook those deficiencies to which my inexperience must necessarily give rise: and having once more gratefully thanked you for the warmth of your

welcome, I ought not perhaps to trespass at this period farther on your time; but I cannot resist the desire to make a few remarks before I sit down, on that engrossing subject which was alluded to in the observation of our respected chairman. This moment is, indeed, one of the greatest anxiety and actual difficulty to all who are engaged in the business of farming; yet I confess I cannot persuade myself to take such a desponding view of our situation and of our prospects. That agriculture has received a heavy blow in the recent changes to which our chairman referred, no one can deny—that a long period must elapse ere our most strenuous efforts can place us again where we were, the most sanguine cannot dispute; but that our position is yet utterly hopeless—that nothing but inevitable and irretrievable ruin awaits us, is an assertion to which I can by no means subscribe. You will perhaps think it presumptuous in me to offer an opinion at all in this matter; to venture on the expression of a different belief from that which is maintained by so many who are better qualified to form a correct judgment on this subject; and presumptuous it undoubtedly would be in me, if, on any question of practical detail, I were to set up my own opinion in opposition to those whose whole lives have been devoted to the practical business of agriculture. But this is not a question of that nature, and here, I think, we are entitled and called upon to take into view some general conditions on which the most unlearned in the practical operations of the farm may yet be competent to reason, and from which we may fairly derive some grains of comfort and of hope. And first amongst these, there is to be remembered that this is far from being the first time that a serious fall in price has seemed to bring agriculturists to the verge of ruin. Even at those periods to which we now look back with feelings of fond regret, when wheat stood at 100s. and 120s. per quarter, the organs of the farming interest were filled with expressions of alarm

and gloom. Then it was predicted that, if wheat fell below 100s. immediate bankruptcy must be the portion of all connected with land; yet wheat fell below 100s., and bankruptcy was still in the distance. Then 80s. was fixed as the final limit of profitable cultivation; yet wheat fell below 80s., and still cultivation was found profitable. Then 70s., 60s., and at last 50s. were successively made the fatal point; yet still they were passed, and not only passed unharmed—not only were none of the dismal anticipations expressed in that event successively falsified, but there actually took place, coincident with that fall in prices, a most amazing and decided increase in the total value of the produce of the land. Farming profits did not in the general case fall; and rents in the general case actually rose, in some instances enormously rose. Now from what cause could that remarkable coincidence proceed? Plainly from this only, that during the whole time that the money price of the produce of land was falling, the actual amount of that produce was rising in a much more rapid ratio; and so the simple question that comes before us now is this, Whether have we now arrived at such a pitch of perfection in farming that this wonderful progress which it has been making ever since it first was practised in this country, and most of all wonderful and rapid within the last few years, must now, in this year of grace 1850, be brought to a sudden stand?—that no advance of the human intellect, no extension of knowledge, no application of science, no exertion of enlightened industry, will from this time henceforth ever bear fruit; but that, so as we now are, so we shall be till the day of doom? That is a proposition to which I cannot, in the slightest degree, yield assent; which appears to me so self-absurd as to be incapable of stronger refutation than the mere statement of it carries with itself. So far from all progress having now ceased, I do think that everything around us testifies that it is even now proceeding at a more rapid rate than ever; and it would be strange indeed if it were not, for it has drawn to its aid appliances to which it never before could have recourse: and it is well that we should remember how important these are, so that in comparing our situation with that of our forefathers, and our difficulties with those by which they were opposed, we should not lose sight of the prodigious advantages which at the same time we enjoy over them. We must not forget how extensive and varied is the knowledge which is now placed at the disposal of the farmer. We must not forget how scientific men of the highest intellect, and distinguished name in almost every branch of natural research, are now devoting their whole efforts to the sole service of agriculture. We have the mechanic engaged in devising new implements, and new forms of old implements, by which the needed operations of the farmer may be more efficiently and more economically performed. We have the botanist, the physiologist, the chemist, all engaged in the investigation of the laws by which the functions of animal and vegetable life are regulated, that from an accurate knowledge of these principles we may be enabled to deduce improved methods of culti-

vation, to obtain more abundant produce from our fields, and larger returns from the feeding of our stock. And most unquestionably we have already derived immense advantages from these scientific investigations, in their infancy as they yet are; and as certainly may we expect yet to receive greater benefits from their pursuit. But do not let me be misunderstood. I am not one of those who anticipate an immediate and unbounded increase in profitable production from the prosecution of such researches; and still less do I think that practical farmers are in any way called upon to devote themselves to their advancement. The beneficial application of science to farming must be of gradual progress, because each step must be confirmed by the tardy experience of practice. And it is not for those who are occupied in farming as a business from which they seek to derive their own support, and to lay up a provision for their families, to step out of their approved and safe routines in order to put to the test of experiment the yet untried views and discoveries of scientific men. But that essential duty, which it would be even improper for the practical farmer to undertake, it is his great privilege and advantage at the present day that he has performed for him by others. Everywhere, in all quarters of the country, there are farms whose possessors, devoted to the improvement of agriculture, and possessing the inclination and the means to aid in this manner, are reducing to practical operations the suggestions thrown out by science. And there the farmer has the opportunity of seeing and of judging for himself the actual value of the results, and of determining, without either expense or doubt, whether they are of such a nature as to warrant adoption by himself. For we must remember that when once the experiment has been tried, the process thereafter ceases to be an experiment; it then becomes, either in success or failure, an established truth, from which we may with absolute certainty expect the same result whenever we seek for it under similar conditions; and in such cases all that the farmer has to do is, therefore, to consider whether the conditions under which he has seen success attend the experiment are such as he himself could profitably ensure it on his own farm. And here, too, we have another of the great advantages which we enjoy over our forefathers. For whereas they were, by the difficulty and expense and tediousness of travelling, almost confined for their whole lives to the locality in which they were born, and were thus apt to contract a certain degree of narrow-mindedness, a disposition to disbelieve in the possibility of any improvement being made on their own time-confirmed practices, or of any other district being superior to them in any department of management; that is a danger into which we are happily little liable to fall, since its principal cause, and its only excuse, does not now exist. We enjoy the amplest means of examining, at little expense either of money or time, what is doing around us; of comparing one district with another; and of selecting from all, those practices which may be most excellent in each. And thus we are enabled to make our own if we choose, the combined experience of many others, and to obtain, almost at our entrance into life, an extent of knowledge such as the longest

life could not accumulate from its own individual observation. That is an advantage which it is almost impossible to over estimate, and the more valuable in this respect, that it is in no respect connected with those speculative theories of which so many entertain a horror, but may be enjoyed, and I am glad to think is enjoyed, by those who most strongly oppose the introduction into practice of any system which has not already received its seal. I will not longer detain you from the business which has to come before this meeting, by entering into any other of the points, and they are many, which—it becomes us to remember, in lamenting our present situation—combine to offer us special advantages, such as never before were enjoyed, in the endeavour to extricate ourselves from it. But there is one subject to which you must yet permit me briefly to refer. I do not wish at all to trespass upon the question which I see is to be discussed at a later period of the evening; yet this you must give me leave to say, that if that more hopeful view, which I have endeavoured to open to you, is ever to be realized, it can only be by the cordial and energetic co-operation of all who are interested in the cultivation of the soil. If those new systems and improved practices of which I have spoken, and to which I confess I look as our only means of escape from the danger that threatens us, are to be brought into use, it can only be through the mutual assistance and combined efforts of both landlord and tenant. And I do hope that, in the altered state of things in which we are now placed, and the altered prospects to which we have to look, the same bond which has hitherto united those parties—the bond of common interest and of mutual sympathy—will still hold them even more closely united together. So united, I do not fear the result. I will not believe that farming alone, of all the arts to which British industry is applied, British skill, British energy, and British perseverance, will fail before foreign competition. I do think that in this art too, as well as in every other, these qualities will yet enable us to triumph in the contest: nor, looking to the unquestioned superiority of our portion in some respects, to our proximity to the common market, to the efficacy, and therefore comparative cheapness of our labour, to the infinite superiority of all the implements we use in cultivation, to our ready appreciation of the daily increasing benefits we derive from the progress of knowledge, to the security we enjoy for the outlay of capital, not to enter upon the many others which suggest themselves, can I believe that that triumph will either be distant or difficult. And so far from agriculture having, from the recent legislative changes, received its death-blow in this land, I do cherish and firmly hold the conviction, that it will speedily rise from its temporary depression, and that we shall yet see it firmly stand in a more flourishing and more secure position than it has ever yet attained. Gentlemen, I have to thank you for your patient hearing, and once more for the great kindness of your reception of me. (Loud cheers.)

Mr. Pitcairn, after the list of prizes had been read by the Secretary, proposed the health of the judges, to which Mr. Ballingall replied.

The successful and unsuccessful competitors, were next separately given.

Mr. HONEYMAN here read an essay on "The present position of the British Farmer considered in relation to his Landlord." In approaching the subject (Mr. H. said) I am well aware of the difficulties which must be encountered. Even in the ordinary tenor of affairs it would have required a vigorous and highly cultivated intellect, and a mind stored with profound and varied knowledge, to have treated the subject in the manner which its importance demands. I could have sincerely wished that the task I have undertaken had been performed by some abler member of the society, as in that case I am sure he would have elucidated the subject with more perspicuity, and acquitted himself with superior propriety. The inherent difficulties of the case are considerably increased by the rules of our society, which, being purely of an agricultural nature, prohibit all political discussion. In course of the essay the greatest care will be taken not to infringe these rules, at least so far as any ill-natured remark or angry aspersion on any political partizanship are concerned. But the question at issue is so much blended with the legislative enactments of the country that political allusions and references can scarcely be dispensed with. Our former legislators showed their sagacity and judgment in fostering and forwarding the interest of the husbandman, well knowing that the strength and resources of a state are commensurate with the successful cultivation of the soil. Poets have hailed his worth in the glowing sublimity of song, and historians have collected and embodied immense piles of facts to attest his usefulness. But the present condition and future prospects of the tenant farmers of Great Britain are subjects the contemplation of which must produce anxiety and dreary forebodings in the minds of every one who has the conservation and stability of the institutions of the country at heart. The wealth and glory of the nation have at all times kept pace with agricultural improvement and prosperity. And it cannot be otherwise, for it is from the exertions and industry of the husbandman that all riches are derived—food, clothing, and many other of the necessities and conveniences of life being the productions of his labour and ingenuity. His intelligence is brought to bear upon the bleak and barren soil, and fertile fields and golden harvests are the rewards of his prowess. The tenantry entered on their present engagements on the faith of the laws of the country remaining nearly the same. They dreamed not of being under the necessity of contending with the difficulties which now surround them. Under this conviction the capital at their command was mostly invested in the soil; a great proportion in permanent improvements being thus issued among the tradesmen and peasantry in the shape of wages. These were not expected to be immediately remunerative; still it was considered they would ultimately pay. At the end of the lease the proprietor would have come in for a share of these improvements, they, being as it were fixtures, adding materially to the intrinsic value of the subjects. The capital required in stock for carrying on improved husbandry is triple, and in some cases qua-

druple, to what was in former times. The very interest of the capital in many cases would enable the farmers to live comfortably (in retirement), even with their money invested at bank interest, apart from all the anxieties and risks incident to farm management. Farming being reduced to the present low ebb, stock will again be converted into cash (so far as practicable), and the farmer will be under the necessity of turning his attention to more remunerative investment. Land will thus necessarily fall in value. The landlord's rent-roll will exhibit a much lower figure, or further enterprise on the part of the farmer must cease. Into whatever district we turn our eyes, improvements of every possible kind have been successfully carried on; and in no age has agriculture advanced so far as that in which we live. The fertility of the soil has been amazingly promoted, and the wages of tradesmen have been raised at least to double their former amount, and the proprietor has had a corresponding increase in the value of his land. But legislative enactments have recently been carried, which are producing material changes in the condition and prospects of the British agriculturist. The introduction of free trade in corn has not only seriously affected his interests, but it has removed all protection and stimulus to native industry. The farmer, groaning under an all save insupportable burden of taxation, is now left without defence or encouragement to maintain the hopeless struggle of contending with the untaxed labour and comparatively expenseless productions of other countries. These sweeping and baneful measures have put things in a very different position from what they formerly were; and when these enactments were on the eve of being introduced—when the capital of the farmer, the rental of the landlord, and the prosperity of the country were at stake—the aristocracy shrank from their former high bearing, turned their backs on their best supporters, and cravenly succumbed to the bravados and clamour of a selfish and interested party. And, as might have been anticipated, the result is, want of confidence and agricultural depression. The basis of that right feeling and mutual confidence which existed between landlord and tenant is sapped and shaken; symptoms of coolness, and in some cases even of jealousy, are beginning to manifest themselves; and if no healing measure is applied, the breach will wax wider and wider every day. On the one hand, in the majority of instances, the landlord in no ways seems disposed to relax his hold on the tenant; on the other hand, under the present depreciation of agricultural stock, it is impossible for the tenant to keep covenant with his landlord. In many cases where application has been made for reduction of rent, a flat negative has been given; and in others an evasive, or at best a doubtful answer has been returned. I would not for a moment be understood to insinuate that these are the results in every case where such application has been made. There is a bright array of proprietors who have generously come forward even without solicitation, manifesting their spontaneous generosity and sympathy with the industrious and suffering tenant. This is as it should be. Every proprietor who has paid the least attention to rural affairs must see that his own interest is promoted

and extended in that of the enterprising tenant; but unless due encouragement is given on his part, it is preposterous to expect enterprise or improvement on the part of the leaseholder. It is not for a moment to be imagined that any sane man is to exert his intelligence, and sink his capital on the property of another, merely for the purpose of proving that the property might be rendered of perhaps double its former value. No. The intelligent farmer selects his farm, and covenants with the proprietor in terms under which he has the fullest confidence of meeting a suitable return for the stock and industry expended in cultivating and enriching his subject. He guarantees a certain proportion of the produce or what is the same, the price of that portion in cash, for the use of the land, taking on his own responsibility during the currency of the lease, unfavourable seasons, rise in price of labour, and fluctuations in the market. The contract is consummated in faith of the laws existing at the time being continued. Whenever any important alteration in these is made, the suffering party must either be relieved from his engagements, with reimbursement for his sunk capital, or else he must have recourse on those who have altered the law under which he contracted; property being only available in proportion to the security of the law by which it is held. Our legislators seem to have acted on the principle when they abrogated the law which guaranteed the property of the slave-owner. Although he trafficked in human chattels—his nefarious marketry being the bodies and souls of his fellow-creatures, at once committing treason against nature, and infringing the principles of our most holy religion—still the legislature granted him many millions for the loss it was alleged he had sustained. And I ask, who were the parties that paid these vast sums? It was in truth wrung from the industry and hard earnings of the British agriculturist. But when a case occurs parallel in all respects, except in its inherent guilt and sinfulness, the duties which protected native industry are at once annihilated without one word about compensation; and the farmer is suddenly deprived of the guarantee and security afforded by the laws under which he covenanted. But to what quarter is the suffering agriculturist to look for compensation, land being the only tangible property? Had the case been reversed—had an equally extensive depreciation occurred in the manufacturing or commercial community, the land would have unhesitatingly been taxed, as it was formerly done, to meet the pretended sacrifice of the slave owner. So long as a reinstatement of the law is hopeless, it must be to the proprietor, and to him alone, that we must look for relief. The interest of the proprietor and tenant farmer being identified, although the former derives his revenues from his rent-roll, yet it is through the agency of the farmer that his lands are rendered available for any profitable purpose; therefore the honest and industrious farmer is entitled to as high a place in public esteem as his landlord. But under the existing arrangements of society, the proprietor enjoys a degree of power and influence far superior to the tenant. Commanding a deeper and more extended sway over the public mind—elevated above the

anxieties and turmoil which agitate and distract a labourer's life, with every species of information at his command—he is thus enabled to take an active part in forwarding or controlling the legislature of the realm. Statesmen, administrators of the law, and officers intrusted with the defence of the country, are almost without exception chosen from his class. The proprietor thus enjoys a very preponderating influence in society compared with the lessee; and for many years past a proper proportion of this influence has been laudably devoted to its legitimate objects—the best interests of the country—the patronage of agriculture. But a change has now come over the spirit of their dream. It would appear that they feel exemption from taking their wonted interest in agricultural prosperity. Through the instrumentality of the aristocracy, as being at the head of affairs, the tenant farmer has been deprived of one-third of his property; and yet they stand coolly by, demanding the last farthing of rent. It is therefore in vain for them to hold out delusive hopes, or to concoct fantastic schemes in order to endeavour to raise the depressed spirits of their suffering tenantry, who are now awake to the sad realities of their condition. High farming is confidently recommended to certain landlords as the infallible panacea for all the evils consequent on free trade. It is the *ignis fatuus* of the proprietor, by the meretricious glare of which he tries to deceive the husbandman and mislead the public. The old prejudiced farmer, who has had the disadvantage of becoming acquainted with the capabilities and peculiarities of the soil in nearly a lifetime's experience, is gravely advised (by my Lord Kinnaird) to rescind his old vulgar notions of cultivation, and to bring his farm to some mighty modern professor of chemistry, who will bring his subject—rocks, bogs, and altogether—into his capacious alembic, and by the sublime process of alchemy increase its fertility to a double or even triple extent. I have visited the localities of some of these “high-farming humbugs,” where the process was being carried on in the best style of the art, and, as stated in public documents, with most astonishingly remunerative results. On minutely examining into the merits of the case, and carefully collecting and comparing every available fact, although I rank amongst the humblest, I was among the first who publicly exposed and denounced the interested, the mischievous, the monstrous calulations which certain parties were palming on the public. My talented neighbour, Mr. Ross, came forward, armed with an unconquerable array of facts and clear common-sense views, and nobly did his part in dispelling the delusion. The formidable Peter Plough next came into the lists; possessing acute perception, a clear judgment, and a refined but caustic wit, he struck the hydra a mortal wound, and it fell never more to rise. His letters, though characterised by a degree of flippancy which might have been spared to advantage, have never been answered, for the best reasons—because they are unanswerable. Proprietors may try to blink the question as they may. By ingenious and specious devices they may palm their quackish nostrums on the public—justifying their conduct in exacting their former rents, blam-

ing the farmer for want of skill and exertion in the cultivation of his land; and farther, declaring that things are yet in a state of transition, and that all will soon be well again. The farmer is not to be hoodwinked; to him it is quite apparent that one of three cases must happen—that some important alteration in the present laws be made, or landlords must make a proper adjustment of rent, or else the farmer himself must be subjected to deep and inevitable ruin. The gains and profits from farming (even in past times) are far inferior to those arising from manufacture and commerce. Now by investing the same amount of capital in manufacturing or commercial speculation, quicker and more extensive profits are procured. The trader can turn over his capital three or four times a year, while it is impossible for the farmer to procure a full return even at twelve months' sight; and where extensive improvements are being carried on, it is only at a yet more distant day that he can hope for a return. None of these delays lie in the way of the trader. When his purchase is consummated, he can convert his commodity into money, and again commence fresh speculation. It is thus apparent that much less capital is sufficient to carry on a more extensive business than if employed in farming; and from the shortness in the period of the trader's outlay, he can avail himself of more extended credit than it is possible for the farmer to enjoy. The articles required for farm stock can never be had unless for cash—the farmer need not go to the market without the money in his pocket. This is not felt by the trader. The present system of banking refuses none of them credit, unless they are unknown, or not known to be deserving of confidence; but it possesses certain features unpropitious to the husbandman. Might not a system of banking be established exclusively for agriculturists, constructed so as to obviate his wants more readily? But without insisting upon a point which may be considered alien to the subject, it is indisputable that greater amounts of capital have been attained by manufacturers and commercialists than have been realized by agriculturists. This is evident from the greater number of merchants and manufacturers who have realized princely fortunes, and have been enabled to retire ere they passed the meridian of life. The proprietorship of landed estates is fast passing from the hands of our ancient aristocracy into the possession of such parties. In corroboration of this statement we have only to turn to Glasgow and other trading towns, where the surrounding country is almost exclusively in their possession. An estate is scarcely in the market when the millionaire starts from his counting-room and becomes the purchaser. And it requires little forethought to predict that, before half-a-century has elapsed, a great proportion of our noble and ancient proprietors will be without an estate, and their families expatriated to seek their fortunes in foreign lands. This is the more to be regretted, as a race of proprietors arising who apparently have little sympathy or community of feeling with the tenantry. Trained in a counting-house, they survey the farmer only in their ledger, viewing him merely as a matter of pounds, shillings, and pence. Habituated to quick returns and

large profits, they are too prone to take the same view of agricultural investment. I am aware that the doctrines of most of our political economists are founded on the assumption that trade and commerce, apart from any other agency, constitute the wealth and strength of a state. This is certainly a delusion; and a general war would soon unveil their flimsy sophistries, and open the eyes of the public to the sober truth. The strength and wealth of a state consist in the density and hardihood of its population; in the extent of its agricultural, fishing, and mining resources. It is not in the number or breadth of its acres, but in the state of cultivation to which they are brought. These *modern statesmen*, acting on such fallacious doctrines, are rendering Britain almost entirely dependent on foreign resources; as, under the present law, native agriculture must languish, and a great proportion of the land must relapse into its natural state, as it will not repay the expense of time and labour required in its cultivation. It is already stated that the depreciation in stock, caused by acting on the modern doctrine, amounts to one-third of its original value, or the whole of that proportion generally assigned to the landlord as rent. Now, in the event of Britain being engaged in war with the corn countries from whom we must shortly derive our supplies, the ports are blockaded, and Britain is left to maintain her inhabitants on her own uncultivated fields. Admitting that the remuneration for outlay in farming is so very low, that bank interest on the capital would be preferable, the question very naturally arises, How is it that a farm lease is scarcely in the market when a great number of candidates appear, offering an equal, and in some cases a higher rent than that previously given? Among a number of reasons, I may state, in the first place, a farmer already in possession of a farm becomes a candidate on the grounds that, his own farm lying contiguous, he is enabled to work the lands upon a cheaper scale than if he were a resident. He can carry on the various operations of farming with more facilities than on a small scale, and particularly if the nature of the soil differ in quality from that he already possesses. As an instance, let us suppose that the one is composed of strong land: being well adapted for wheat, he is enabled to proceed with double force at the critical seasons of wheat-sowing—thus, in many instances, almost securing his crop, compared with the slow process he would otherwise have had to adopt, the weather at these seasons being very variable. We have often known large fields comparatively lost for want of fiar. Secondly—The land being of a lighter and cheaper description, he can raise a far greater weight of turnips (on such land) for his money, and enriching both subjects by a greater quantity of litter in the one case, and an extra quantity of turnips in the other, consequently enabling him to maintain a greater quantity of live stock. It is thus supposed that both belong to one landlord; and although they do not, the advantages, particularly in sheep husbandry, are very great. Another reason may be, that individuals habituated to agricultural avocations, and having spent the better portion of their time and energies in acquiring a knowledge of the science,

it is almost impossible for them to turn their attention to other pursuits; consequently they bid to the last possible farthing they consider they can draw from the soil (of course after paying incidental expenses). Again, many are possessed with perhaps a foolish notion that they have a superior knowledge of cultivation to their predecessor. And lastly, I shall mention a numerous class whom we may denominate amateurs, having little or no knowledge of agriculture, and labouring under a false impression that to be a practical farmer they have to get a lease granted them, and say unto the fields, "Bring forth for the harvest!"

At the conclusion of the essay, which was received with loud applause, Mr. Honeyman read the following resolutions, which he moved the adoption of:—

Resolved that—1st, Although this society fully appreciates the value of a knowledge of the principles of science in its applications to practical agriculture, yet it has no sympathy with those who are continually holding up Scotch farmers as examples of industry, and famous for paying high rents, but who commonly turn round and taunt them with want of skill and science in cultivation.

2nd. The amount of capital now required to carry on the operations of husbandry is so much increased that the security and safe investment of it in the soil must become a matter of paramount importance in the advancement of agriculture.

3rd. If a higher standard of farming be now considered necessary to meet the change of circumstances under which farmers are at present placed by the depreciated value of agricultural produce, such high farming can only be attained by a right appreciation of its requirements on the part of the landlord, whereby mutual confidence between him and the tenant may be secured, so that such conditions of fertility as ought to be regarded as necessary fixtures, and as adding materially and permanently to the value of a farm, may be maintained to the termination of a lease, without prejudice to the interests of the outgoing tenant.

Mr. CARSWELL, though very far from expressing his concurrence with many of the views adopted, and many of the sentiments expressed in Mr. Honeyman's elaborate essay, would propose a bumper to his health.

The healths of the chairman and of the landlords of Fife were drunk, after which the discussion took place on Mr. Honeyman's essay.

Mr. RUSSELL, Kilwhiss, said: In giving my assent to the resolution, which has been submitted to the meeting, I beg to state my reasons and grounds. We will all readily admit that a true knowledge of the principles upon which the art of culture depends, will assuredly lead to economical results in the details of husbandry. The rapid strides which chemistry and the kindred sciences have made within the present century, have thrown much light on the rationale of many of our practices. The deep researches of the genus of Liebig afforded him materials to link together the disjointed and fragmentary labours of other hard workers in the same field; and the seeds which Tull, Young, Davy, and others had sown, are now beginning

to burst into luxuriance. Liebig's beautiful theories of vegetable and animal nutrition took the world by surprise. Great expectations were formed from the truths which were revealed in the laboratory of Gies-sen, but they have only laid the foundations for a superstructure which later generations will have to rear. Some men of sanguine temperament seem actually to have believed that the exhausted ground was to have its virtues renewed, and to be fertilized as by the wand of a magician. But, alas! the old antidote still stares us in the face, and ever will do so, that the grateful earth will only yield her riches, through the hard and unremitting toil of her sons. Science can only shorten the way. I cannot omit this opportunity of referring to the Agricultural Chemistry Association of Scotland, in its present efficiency, as scientific progress in the right direction. If its merits could not be defended on far higher grounds than as a terror to those who would carry on extensive adulterations of artificial manures, it is worth more than triple the money that is spent upon it. The introduction of the scientific element has, however, had its disadvantages, for straightway there arose a host of interpreters who took great delight in discussing the experience of the practical men, and who looked with contempt upon the past, and wholly became the worshippers of the untried and the fanciful. A crisis has arrived which all admit. The cultivator would fain have the recipient of his toils bear part of a burden which must be borne; but no, science would interfere, and tell him he must carry it all himself. The whole island is ransacked for his behoof. There never was a period when so many physicians prescribed for agriculture, without knowing or studying her organic and local maladies. Some cry out "Plough less and graze more," others the reverse. Each nostrum, however, serves its day, and time flies on. We Scotch farmers have stupidly lost our renown; our doings, which were formerly boasted over the whole world, are now treated with contempt, and all because we want science. Petty writers shelter themselves under great names, and join in the common hue and cry. The following isolated sentence appeared in a Scotch magazine of last month:—"The agricultural produce of our island might be *doubled* by a more perfect application of the principles of botany and chemistry." I need not add to this. Who are the modern guiding stars that we are directed to look to? Mr. Huxtable, amid all his scientific bravery, has scarcely faith in the new order of things. Statesmen are, however, directed by him in his recent pamphlet, if need be, to the proper objects for taxation. What comfort do we Scotch farmers obtain from his definition of an "agriculturist." Hear him—"For myself, as an agriculturist, *that is a producer of wheat, beef, mutton, and pork*, I should deprecate the reimposition of any duty whatever upon *lean cattle*, beans, oats, barley, lentils, and oilcake." We are allowed to shiver in our "ungenial" climate, that science (!) has given out to the "forest zone," and placed on the "verge" of that territory beyond which wheat will not ripen. This

proposition in Mr. Huxtable, for a good price of wheat, has its root in the same circumstances which prompted the Herts farmers in 1810 to maintain that a quarter of wheat should be four times the price of a quarter of oats. Mr. Huxtable is exceedingly happy and courageous when he imagines he is in possession of the real chemistry of agriculture—the principles of which he has taken upon him to enunciate to the "unchemical reader." He breaks out into the following raptures in regard to Mr. Lawes', of Rothamsted, experiments on wheat and turnips:—"Experiments," he exclaims, "so admirably arranged and philosophically interpreted, that they have revealed what lay all concealed through the 'dark ages' of mere practice, the laws which govern cereal growth, and have reduced the conditions of wheat and turnip growing within the cognizance of fixed principles." Mr. Lawes deserves much praise for the labour he has bestowed in arranging the experiments in question. In this respect they are the best extant. But the refined distinctions which have been drawn between the requirements of the two classes of plants have no existence whatever in nature. Mr. Huxtable does not act upon them. The whole spirit and practice of the Scotch system of farming are directly opposed to such doctrines. We are surprised that the Royal Agricultural Society, under the guardianship of a consulting chemist, has not seen through the fallacy. We do not despise nor underrate Mr. Huxtable's labours. His theory may be erroneous, but his practice might still command attention, if he could boast of results—just as any one may do who has no pretensions to science at all. Whoever thinks he possesses the true secret, although it may be a mere delusion, yet it will fortify him in his pursuits, and with industry and common sense to carry out the maxim of No want, no waste, he may accomplish wonders. And by all means give science the credit, if he still desires it. The alchemists were cheered and invigorated with their *caput mortuum*. Most unfortunately for us agriculturists, we are making too many discoveries to be all genuine. We cannot be expected to come up to Mr. Mechi in his ever-hopeful ever-brilliant anticipations. Those who have a wish to see the encroachments of the wheat on the heather, should by all means pay him a visit—he is a true farmer's friend in every respect. We have no wish to see his balance-sheet. It must be so far a caricature on nature, as well as art. What are the grand results? Good heavens! were the ghost of Jethro Tull to pick up a statement of what Mr. Huxtable calls the "rural scenes" of this celebrated Essex farm, he would exclaim—"A mountain in labour!—the beast's ordure from 1000 qrs. of corn and hundreds of tons of turnips to raise 500 qrs. of wheat! Where is my hoe? Plough, have the plants lost their mouths?" No, we might be tempted to reply, nor have the "ungrateful bullocks" lost their stomachs. Modern science has shown that there is no pasture for the "King of Grains" here. Tiptree-heath is five quarters below zero. But if we descend and notice other enunciations of the "great principles," how painful does it become to the lover of pure science when we see agricultural chemistry personified in an astro-meteorologist—a dis-

ciple of Zadkiel—holding a carse landlord and his tenantry in gaping wonder and amazement at an unmeaning lecture on the science of farming, and, as usual, give them scientific flattery as a prologue to scientific censure—the one being as undeserved and useless as the other. Who was it that lowered science in the eyes of the practical men in this neighbourhood, but he who, enjoying a great reputation, stoutly demanded that a field should be thoroughly and artificially drained which was naturally capable of swallowing every drop of water which falls in the district for a mile around it? Must we actually humble science with her own doings, before she will know her true office? The modern agricultural tourists would afford ample materials for illustrating the quackery of science, from the “Thunderer” downwards. It may be amusement to them, but it is not so to us. Influential parties think all can be done without any effort on their part, and no doubt they have high authorities to quote for their backwardness. They are not inclined to view our position as the result of circumstances by which we have been moulded to the peculiar pressure that we have been subjected to from within and without. Every system of agriculture, in its infinitely varying relations, tends to shape itself into such forms as will present the least resistance to those elements over which she has no control, and, like the vane, will veer as the wind blows. Mr. Milne, of Milne Graden, after a residence for some months in England, sees many strange practices, and his faith becomes shaken in the “intelligence and zeal” of the Scottish farmers. But he is sadly puzzled with results; for he says—“In Scotland, if the husbandry is not superior to that in England, at all events more is made of the land, and higher rents are paid for it.” It would furnish interesting matter for illustration, why the two extremes of high and low farming meet so closely in one important item, that of rental. Take Ireland on the one hand, and Norfolk on the other. Norfolk fortunately had a more sterile soil, and a less fertile climate, which unfitted her for the Irish rotation. Barbarian cultivation was at once overthrown towards the end of last century, as soon as the more refined wants of a rising commercial nation had to be supplied. Ireland’s bounties have been turned into a curse. Human nature is the same everywhere: why be so fond of gilding the distance? A good example, and the encouragement of industry and capital, will as certainly produce satisfactory results at home as abroad. With what comparative complacency must our Aberdeens, Richmonds, and Lei-

cesters view the present writhings of agriculture, when they have the satisfaction of having done their duty! It is not science or climate which has effected this. There is no country in Europe which is more favourable for a system of large farms than Britain. Much has been done; and notwithstanding our difficulties, I still think that we have a good field before us, if mutual and intelligent relations are maintained between landlord and tenant. This is, however, the real difficulty. For I must confess that if a system should exist in which it is the interest of any party that the first part of a long lease is spent in bringing a farm into condition, and a certain period is required to bring down the standard of fertility before its termination, such must have within itself the elements of decay. Government grants for particular ends only show that the relation between landlords and tenants is defective. An old-established art should lay her own foundation out of her sweats and toils, instead of being pampered up by mistaken friends, who will do her no real good, but will only more surely lower her status. Such being my opinions, I heartily second the resolution. (His speech was warmly applauded, and the resolution was unanimously adopted).

BAILIE JOHN MITCHELL proposed the health of Mr. Russell, saying that the society were under deep obligations to Mr. Honeyman, and especially to Mr. Russell for what had been read.

MR. DINGWALL seconded the second resolution, which was unanimously carried.

MR. HAXTON, with great power, discussed the third resolution. He regretted exceedingly the spirit and the political tone of Mr. Honeyman’s essay. He reprobated the imputation of selfish and interested motives to parties that were as disinterested as Mr. Honeyman himself. Such epithets as “high-farming humbugs” had no logic in them, and went for nothing. It would be an easy task for a free trader to answer the essay, but he supposed that Mr. Honeyman meant it to be noticed and answered by landlords alone. Mr. Haxton then, in a few pithy remarks, showed what he meant by tenant right. He held that all such permanent improvements as draining, fences, and additions to the steading, were the property of the tenant, and that at the end of the lease he should receive an equivalent for them. The third resolution was unanimously carried.

Various other toasts were given, and the company broke up, satisfied that, although the show of cattle was not a large one, their interchange of opinions and views after dinner would lead to highly beneficial results.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

(From the Morning Chronicle.)

HERTS, HUNTS, BEDS, AND CAMBRIDGE.

In a former communication I referred to the sanitary condition of the agricultural labourer in these counties as respects his dwellings. I propose in the present Letter to give some account of his employment, and of his wages.

In those parts of the county of Herts which, from their proximity to the metropolis, may almost be considered as forming portions of its suburbs, it will be found that not only is employment more constant, but the wages are generally speaking higher than in most

other parts of the county, being from 8s. to 10s., and in some cases as high as 12s. per week. The whole of that part of the county in the neighbourhood of the town of Hertford and Ware is studded with the dwellings of resident proprietors: the condition of the labourer consequently receives some share of attention, and employment is almost constantly to be obtained. In some parts, however, where there is a considerable extent of grass land, regular and constant employment cannot be found for the whole of the population. One gentleman, however, who has been a resident in the parish of Shenley for upwards of fifty years, and who has expended a considerable portion of his income during that time in improving the condition of the labourer, and in affording him the means of employment, states that, notwithstanding there being a great quantity of grass land in his parish, and a considerable population, he believes "that but for the public-house nuisance, and its consequent temptation, not a soul in his parish would go to bed hungry or be badly clothed—that the higher the wages, the wife and children are nothing the better if beer-shops intercept the most of them." He adds, "I believe that in this parish there is one beer-shop to considerably less than one hundred souls." The same gentleman, still speaking of this parish, says, "We have a police, very expensive, and of no use—no near magistrate—very little dissent, but not too much religion—and, I think, very little crime."

Throughout the greater part of the counties of Bedford and Cambridge, the average wages may be taken to be about 8s. for married, and from 5s. to 7s. for single men. The "horsemen" usually receive more. Happening to meet with one of this class of persons—a young man, apparently of about twenty years of age—I inquired as to his weekly rate of wages. "Oh," said he, "they be very poor indeed; they be only six shillings." I well knew, from what I had previously heard on the point of wages, that my informant was indulging in some reservation on the subject; and upon further pressing him as to the amount he received for "year's end"—a sum of money paid to the labourer at the end of the year—he proceeded, with some amount of physical exertion, to draw forth a watch from his pocket, about the proportions of a moderate-sized dial. "Why here, maister," said he, "d'ye see this? This is my 'year's end.' I give three pun ten for this and the chain; a bran new slop cost me seven-and-sixpence; a new coat was two pun ten, and that was just a little above my year's end." With his weekly wages and "year's end" his wages would therefore average about 8s. 6d. per week.

Upon the farm of the Duke of Bedford, at Woburn, the wages generally given are about 9s. a-week for farm labourers, and from 10s. to 11s. for horsemen. In the fen lands of the Isle of Ely and Huntingdon the wages are about 8s. per week. In the Linton union, in Cambridgeshire, there are several parishes conspicuous for the wretchedness of the condition of the labourer, and the low rate of wages. In more than one of the parishes in this union, the whole of the cot-

tages have been pulled down, and the labourers, being compelled to live in Linton, have to walk considerable distances in going to and returning from their work. There appears to be a great desire on the part of some of the farmers to avoid giving the labourer more work than is absolutely necessary. I was informed of the case of a man who was known to be one of the most notorious poachers in the district, and five of the farmers actually subscribed together 5s. a-week to assist him in obtaining his livelihood, and to prevent his coming to the board of guardians; they at the same time well knowing that, as they would not give him work, he would make up the deficiency by poaching. "They're a screwin', close-fisted, hard set of fellows—that's what the farmers are all about here," said an old labourer to me. One of the most influential of the guardians told me that both himself and the reverend chairman of the board were constantly endeavouring to impress upon the farmers the necessity of affording some employment for the people. A determination upon the part of the chairman of the union to act strictly upon the principle of the poor-law, viz., the application of the work-house test to the labourer as well as to the employer, has been attended with very considerable success. Upon one occasion of a meeting of the Board of Guardians, there was a farmer present who was notorious for the small amount of employment which he afforded to the people in his parish. While at the board, it so happened that three families came up for relief who belonged to his parish, one with seven, a second with eight, and a third with nine children. What was to be done with them, was the question put by the chairman. "Send 'em to the house," was the reply of the farmer. Orders for their admission were accordingly made out by the clerk. The farmer in question was the principal ratepayer in the parish to which the families belonged. "What will be the weekly expense to the parish of these thirty persons, inquired the chairman of the clerk. "About five pounds a-week," was the reply. "My share of the poor-rate won't be less than three pounds of that," said the farmer. "I can get 'em to work for me for 8s. a-week; that'll be only 24s. a-week. Call 'em in." The applicants for relief were accordingly re-admitted, and, to their great surprise, the father of each family, instead of receiving an order for the work-house, was told that he would be employed on the farm at work of some kind or other. From that time to the present there has scarcely been an application for relief from an able-bodied labourer of that parish.

The "ticket system" is one that is very generally adopted in this and other parts of the county, as well as in the adjoining counties of Essex and Suffolk, and in some parts of Bedfordshire. Under this system no relief is afforded to any applicant unless he can show, by the production of his ticket, that he is unable to obtain work. Many opinions have been expressed as to the effects upon the labourers of this mode of affording relief. It has been considered by some that it operates unfairly towards the labourer, inasmuch as it compels him to take any work that may be offered to

ever we can we give a shilling or so off as we can spare it. We pay sixpence a-bushel for coals at the parish. They allow us to have 'em for that price. We have got a rood of ground. We pay 7½d. a-month for it. We've got such a family that we eat nearly all the taters off it soon after harvest, and can't save many for the winter. Sometimes my oldest girl arns a trifle at 'smocking,' that is, making smock frocks. She can get 1s. 6d. a-week at that if she works hard and regular. Sometimes I can get a shilling or so at it, but there's nothing doing at that now. When I was confined with my last child the parish allowed me a shilling a-week for my month, and a little longer, for I was so poorly that I could not get about; I could not get strength nobows at all, and then I had to give the nurse something every week. I have one son as is married, and he has got one child, and nothing to do. I expect he will have to go into the workhouse soon. They wont let such as we go into the house. The farmers gives my husband a day's work or two in the week, and then they think we can manage to keep out; but I'm sure we should all have perished if it hadn't been for the shopkeeper letting us have a little bread and flour. I don't like to go in debt no further than I can help; but I'm druv to it. If there's anything I should like more than another it would be to be out of debt, and then I should not care how soon I died; that I should not, for I'm sure my children would be all better off in the workhouse than they are now. As to meat I seldom or never see a bit of it in this place."

Another woman, whose husband had not been able to work for the last five years, received 3s. 6d. a-week from the parish, and had seven children to support, the eldest of whom brought home from 1s. 6d. to 2s. a-week, but had not been in work for the last two or three weeks.

At a third cottage which I visited, the father of the family had been out of work for many weeks; there were five children at home, the eldest girl being seventeen; none of the younger ones had either shoe or stocking to their feet, and they were all wretchedly clad. "We have not," said the eldest daughter, "tasted any bread for two days. We have had nowt but 'turmut's' (turnips) to eat. We boil 'em for dinner, but the children are so hungry that they wont wait sometimes till they're biled, but eats 'em as they are." The whole of the family were about to emigrate to the Cape of Good Hope. "The papers had all been signed, and they expected to go every day." "My husband," said a woman who lived in the next house—a damp and wretched place, with a stagnant ditch close to it—"is out with a few mats, to see if he can sell 'em. He gets threepence a-piece for 'em when he can sell 'em. He has had no work for three months. My eldest girl used to earn a little at smocking—about eighteenpence a-week. She ain't had nothing to do at it though lately. I have not tasted a drop of tea, a bit of sugar, or a mite of butter for many weeks, and I can't eat the 'turmut's'—they perish my inside so; so I has a bit of bread from one of the others has the 'turmut's.' A few doors beyond

was another family, consisting of five children, the mother of whom said—"My husband has not had more than half a week's work for the last two or three weeks. Sometimes we get a mite of pork, sometimes mutton. Last Sunday I got four penn'orth of mutton; but lor', when that's cut up into seven bits there isn't much of it a-piece." Many other instances of a similar kind might be quoted from this place, but the tales of misery and privation vary so little in their general features that to mention more would be but to weary the reader for no practical purpose. We will, therefore, pass on to the adjoining village of Shudy Camps, where, if possible, the condition of the labourers is even still more deplorable, and their miseries more intense. I thought that in Castle Camps I had fathomed the lowest depths of misery. Not so, however; the wretchedness and misery of the agricultural labourer in this part of the county appears to be an unfathomable abyss. Beyond the "lowest deep" there is always a "lower deep;" and I despair of ever discovering that point at which it may be said, "Thus far can misery go, and no further; and here is the extreme verge beyond which humanity cannot exist." The tenacity of life among the agricultural labourers is almost incredible. Sheep, cattle, and pigs would not exist in many of the hovels where those who tend them live; and if these animals were to endure one-half of the amount of privation which the peasant undergoes—if their food were as scanty and as unsuited to them as is the diet of the labourer to him—if the cattle shed of the oxen and the sty of the pig were not better provided with litter for them to lie upon than are the cottages of many of the labourers with bedding—and did they not afford better protection against the inclemency of the weather than do many of the miserable hovels of the labourer—the extent of mortality among them would speedily call forth, on the part of their owners, all the energies which self-interest and the love of gain could excite in them.

In Shudy Camps destitution and want appear to hold unrivalled sway over the miserable inhabitants. There is no resident proprietor in the parish, nor within some distance of the place, neither is there an individual residing in the place who is able to afford any assistance to the people. The hand of charity, which alleviates in some measure the distress of the agricultural labourer in other parts, is never opened in this village, and none but the relieving officer of the union, as he distributes the parish allowance to the sick paupers, enters, for purposes of relief, the miserable dwellings of the people of Shudy Camps. The roads to these parishes are impassable in almost all kinds of weather. After a few days of rain, a strong current of water from the high grounds in the vicinity flows down with such impetuosity as even on some occasions to carry horses and carts away. On the occasion of my visit the water was from eighteen inches to two feet deep. The village itself, and indeed a great part of the country for several miles round, is the property of the Charterhouse. Not a farthing of the rents of the cottages or farms is spent in the place, or

devoted to the purpose of giving employment to the people, or of improving the soil. The governors of the Charterhouse can scarcely be aware of the condition of their tenantry, or they surely would not leave them in their present wretched state.

Here are the accounts which two or three of the people give of their condition. The first was given by a woman apparently about 40 years of age, whose sunken eye and hollow cheek told too plainly that disease and want had almost done their work upon her. She was so weak that she could scarcely support herself. The day was very cold, and her eldest son was just dragging in a small branch of a tree, which the wind had broken off. "I've six children at home, and two in the workhouse," said she. "My eldest boy here is turned of 14, and when he is at work he earns 4d. a-day at stone-picking. My youngest child is a year and a half old. The boy that's in the workhouse is sixteen, and the girl is eighteen. When the girl was at home she used to do a little work at 'smocking'; but she's had nothing to do for a long time, so she went to the workhouse. It was the best place she could go to. My husband has 7s. a-week when he is at work—nobody has more than 7s. now—some of 'em gets less. This week he has had three days and a-half's work—the weather has been bad, he couldn't work any more; last week he had three days, and the week before he hadn't none. We don't have anything from the parish, because there's none of us ill. They've wanted me to go in; but I'd rather stay out if I can manage to do it anyhow. I've had nothing but a bit of bread to-day. I went to the person as employed my husband for a day and a half last week, and I asked him to let me have the money, for I hadn't a bit of bread at home for the children; and he let me have eightpence, and I bought a loaf of bread with it, and a little bit of tea, and we shall make shift with that till my husband comes home." She went on to say that latterly she had been subject to fits, and that she frequently fainted away because she had not victuals enough. "I go without so long," said she, "that everything gets swimming, and goes round with me, and then I can't stand up no longer, and goes off fainting like." The condition of the cottage was most deplorable. In an outbuilding attached to the dwelling—the clayey floor of which was damp and muddy—was one of those uncouth-looking wooden frames, which by courtesy are called *bedsteads*, upon which lay an indescribable collection of mud-coloured rags, which served as covering for one portion of the family, while in another corner of the room, but scarcely distinguishable from a heap of the clay of which the surface was composed, was the sleeping place of the remainder of the inmates.

In the adjoining cottage dwelt a family ten in number—the eldest boy was 24. "I," said the eldest girl, "am 21; my youngest brother is a year and a quarter old. My father and mother and all of us sleep up in the roof. My oldest brother earns 7s a-week when he's at work, and my father earns the same—he is at work on the roads this week. My brother's out of

work now." "I haven't got," said another woman, with tears in her eyes, who was crouching down over a few cinders in the fire-place, "a mite of food in the house, and I've just put the last twig of wood on the fire. I went to the clergyman this morning, and I asked him, for God's sake, to give me sixpence to buy a bit of firing with; and he said he could not afford it, and that he was as bad off as I was. I went out into the hedges, and picked up a few mites of wood. My husband is in pretty constant work, and gets 7s. a-week, when the weather will let him work. I have had thirteen children, and I've got eight of 'em at home; some of 'em is in bed—they're warmer there than they would be up and about, for they've got no shoes to their feet. We get through a bushel of flour in the week, and that costs us 7s., but that's not enough for us sometimes. One of my boys earns 1s. 6d. a-week at "bird-scaring," but none of t'others don't earn anything. One of my children has gone in the workhouse, so that saves us something. We've got a little bit of ground that we pay 5s. a-quarter for; we've sowed it with a peck of wheat this year: we had a few taters last year on it, but they didn't do us no good, the ground was new broke up.

A labourer, to whom I was speaking on the subject of his wages, said, in answer to a question which I put to him, "Live, sir! we don't live, we only breathe! How can a man and his family live on 7s. a-week, and pay 2s. out of it for his rent?" "But," said I, "you do manage to live—what do you live upon besides your wages, which, you say, are not enough to keep you?" "Well, then, if you must know," said he, "we steal—we're forced to do it. Why, if it wasn't that we bent 'the twig' sometimes, how could we live? Put some of the gentlefolks in our places, and see if they wouldn't do it, too. I was coming home the very last night of all by —'s park, and I see a something run across the road. I huv'd a stone, and bless me if I didn't hit her, and I took her home, and no harm neither; and now you may go and split on me if you like—I'd as soon be in gaol as out. I had but two days' work all last week, but me and the young uns had a hare for dinner for all that. Do they think they're to starve? I'm blessed if they shall if I can hev' a stone or"—— (pointing to the hedge, and indicating by the motion of his hands the mode in which he would proceed in setting a snare). I was perfectly prepared for the answer of the man, as I had been given previously to understand that great numbers of the inhabitants were obliged to have recourse to poaching to eke out their existence. In point of fact, in many of the cottages which I have visited in different parts of the country, I have seen unmistakeable signs that the inmates do not live upon bread alone. Entering somewhat hastily into one of the cottages, I observed a great bustle among the inmates, and the eldest child was carrying into the out-house a shallow red pan or dish, upon which I could plainly see the greater portion of the body of a hare, while in another corner of the room lay a skin, which, from its apparent freshness, I have no doubt belonged to the hare off which

they were dining. On casting my eyes towards the table, I saw the father busily engaged in turning the contents of the plates into an old hat, which the man afterwards proceeded, with an air of assumed indifference, to place upon his head. When the perturbation into which my unceremonious visit had thrown the family was somewhat allayed, the father of the family, which was five in number, proceeded to inform me that he had been out of work for the last week or two, and that the last time he was in work he made only three days in one week, and four in the previous one. "If it wasn't," said he, "for what we pick up sometimes, I am sure we should starve." The phrase "pick up" is one that is used very frequently among agricultural labourers; and I have found that it is one that almost invariably applies to something from the neighbouring preserves. Speaking to some children at a short distance from this village, one of them said that they had had "a Jack Caw" for dinner. The naturalist would probably be puzzled to know what kind of creature was intended by a "Jack Caw." This creature, however, is neither more nor less than a cock pheasant, a hen of the same species being denominated a "Jenny Caw." Each description of game, and even poultry, has its alias among the agricultural labourers. I was informed that the reason for giving other names to game and poultry was, to prevent the children from knowing what they actually were, and thus to render them incapable of telling to others the real names or description of food which they might have had at their meals.

In a number of other cottages which I visited I heard the same tale of want of employment and insufficiency of food, and saw the same kind of wretched dwellings and miserable inmates. I obtained from them an account of what they had had for their Christmas dinners, and the result was that six had had bread and potatoes; three, bread, potatoes, and turnips; two, apple puddings and potatoes; two, a "little bit of plum pudding" and turnips; and the remaining one had a piece of pork, turnips, and plum pudding. I had previously visited the workhouse of the union in which these villages were situated, and I learned that

on Christmas day each inmate had eight ounces of roast beef, one pound of plum pudding, one pint of beer to every grown person, and half a pint to all under nine years of age. Each of the females had an extra quantity of tea and sugar, the old woman had an ounce of snuff each, and the old men an ounce of tobacco. The breakfast of the men consisted of a pint and a half of gruel, and eight ounces of bread, and that of the women of seven ounces of bread, and the same quantity of gruel. The supper consisted of an ample allowance of bread and cheese. The snuff, tobacco, and extra tea and sugar, it must be stated, were the gifts of the Rev. Mr. Townley, the chairman of the union.

The following is a copy of the usual diet of the inmates of the workhouse:—

DIETARY FOR ABLE-BODIED MEN AND WOMEN.

	Breakfast.		Dinner.						Supper.	
	Bread.	Gruel.	Beef.	Pork or Bacon.	Soup.	Potatoes.	Rice or suet or pudd.	Cheese.	Gruel.	
	Oz.	Pts.	Oz.	Oz.	Pts.	Oz.	Oz.	Oz.	Pts.	
Sunday.. { Men	16	1½	5	..	..	16	..	..	1	
{ Women ..	14	1½	5	..	..	16	..	..	1	
Monday. { Men	16	1½	..	..	1½	12	..	1½	1½	
{ Women ..	14	1½	..	..	1½	12	..	1	1	
Tuesday. { Men	16	1½	..	4	..	16	..	..	1	
{ Women ..	14	1½	..	4	..	16	..	..	1	
Wednesday. { Men	16	1½	..	..	1½	8	12	1½	1½	
{ Women ..	14	1½	..	..	1½	8	12	1	1	
Saturday. { Men	16	1½	..	..	12	12	12	1½	1½	
{ Women ..	14	1½	..	..	12	12	12	1	1	

Old people of 60 years of age and upwards may be allowed 1 ounce of tea, 7 ounces of butter, and 8 ounces of sugar per week in lieu of gruel for breakfast, if deemed expedient to make this change.

Children under nine years of age to be dieted at discretion: above nine to be allowed the same quantities as women.

Sick to be dieted as directed by the medical officers. The giving both gruel and cheese at supper is optional, and the Board of Guardians may discontinue either one or the other at their discretion.

(To be continued.)

ON MAKING PLANTATIONS OF YOUNG FOREST TREES.

Having, in your *Journal* of the 19th of October, written on the subject of transplanting large trees, I now offer some remarks on making a plantation of young trees. In doing so I will first notice the utility of draining. When the site is determined on which a plantation of trees is to be made, the ground to be so occupied should be minutely examined, in order to ascertain whether it is sufficiently dry for the purpose intended; if there is too much moisture, draining, of course, must be resorted to. As regards the draining of plantations, there is a wide difference of opinion, some approving wholly of open drains, whilst

others, on the contrary, approve of tile drains. In giving my opinion on this point, I say that in all ordinary cases I fully agree with those who use the tiles. The open drains are perhaps cheaper, but after some years it will be found that, with additional expenses incurred in cleaning (which operation should be performed at the least once a year), the total cost of drains constructed on the tile-and-sole principle is much increased, without taking into consideration the ground occupied by the open drains. In speaking of tile drains, the mode I would adopt in their construction would be, not to take as a criterion, or be actuated by, any particular substratum

less than four feet from the surface of the ground, but would, in all cases where the roots of trees were to occupy the soil above, lay the drains at a depth of four feet; and even at that depth, should a firm bottom not be obtained whereupon to lay the drains, I would make them still deeper, as I consider it a waste both of material and labour to drain plantations at a less depth. In support of the practice of deep draining, I have seen a plantation of hard wood, of about forty years of age, standing on a moss soil, and drained on the tile-and-sole principle; but owing to some mismanagement water was collected at the surface, so much so that many parts of the wood were rendered impassable, consequently the whole of the material composing the drains was removed at a depth varying from $1\frac{1}{2}$ to $2\frac{1}{2}$ feet, when the present existing cause of obstructing the water was revealed by discovering lengthened and firmly interwoven collections of fibrous roots, perfectly moulded to the shape of the tiles. Receptacles were then prepared to a depth of four feet, in which to relay the drains, deviating where necessary from the old lines; thus the drains were completed. A stratum of strong clay was arrived at, which afforded an excellent firm foundation to the drain; in this stratum there were few roots of any denomination—so few that I am convinced that, had the drains originally been laid so low, at that day free ingress and egress for water to the drains would have been the result. So short a time as a fortnight only after the completion of the drains, the agreeable change apparent in the ground was almost incredible. I may observe that at the time this operation was performed, the trees bore the evident aspect of premature decay. The principal conductors, or main drains, should be four inches deeper than the branch drains, which would be 4 feet 3 inches, the additional four inches being for the purpose of effecting a declination in the three feet at the discharging end of the branch, which gives a greater rapidity of motion to the water at that part, materially aiding the preservation of a free and open inlet. It is advisable, when practicable, to make the branch drains, discharging into the same main, straight and parallel to each other, with the exception of that part contiguous to the main drain and where the declination is, which should be slightly curved in the direction of the water's course, to be continued in the main, whereby the waters being discharged from the branches are carried to the waters which may be already collected and flowing in the main drain, the lengths of the drains and space intervening to be in accordance with the state of the ground to be so drained; but to avoid, if possible, the making them too long; for in time of obstruction, the cause of which, on examination, may the sooner be detected and the evil remedied. One great essential in draining is to exercise great care in depositing the drains. The communicative joints of the branches to the main ones should be well covered with porous matter, such as broken tiles or stones; indeed, where such matter is plentiful, the whole should be covered to a thickness of nine inches, which would much facilitate drainage. Summer is the most suitable season in which to perform those operations, affording time for a subsidence of the soil ere planting is commenced.

If the ground on which a plantation of trees is to be made be drained in the summer, it would at the same time be better to enclose it; also to prepare a border for the hedge's reception, it being in readiness against the time of planting. Having concluded my remarks on draining of ground for plantations, I will proceed to give an outline on the planting of such ground with young forest-trees. I suggest that a computation be made of the statute acres contained in the area to be extended over in the formation of such plantation, also the total number of trees required to fill the whole, allowing an interval of from three to three-and-a-half feet between. In the formation of plantations there are three objects, and which I consider to constitute the whole; viz., planting for ornament, for profit, and for shelter; in some instances a combination of the whole is approved of, in others of two, or singly, either for ornament, profit, or shelter. I do not concur in the opinions of those who particularize the making of plantations individually to those objects. Where shelter is wanted, it is necessary to have in view also ornament and profit; and where that of shelter is not the question, to be actuated wholly by principles of ornament and profit; for by introducing profit, any detraction to the ornamental may be avoided; neither may ornament, on the other hand, detract from profit; but by a perpetuation of their unity will prove advantageous. A liberal distribution should be made of the most profitable kinds of trees, comprising oaks, ash, and larch, which will materially enhance the value of advanced thinnings, and add greatly to ornament. Regarding the different modes of inserting the trees in the ground, I prefer that of pitting (that is to say, planting them in open holes or pits), which method should, with one or two exceptions, invariably be adopted; the slit method (that is, thrusting the spade in the ground, pressing it to one side, and inserting the plant in the opening made) is certainly more expeditious than that of pitting; but if at all used should only be in the insertion of seedlings; as it must be acknowledged that inserting trees of from three to four years old from the seed bed, by the slit method, the roots are contracted into about half the space, compared with the space afforded in pitting, which serves materially to retard their progress. Insertion by the planting mattock is quite its equal, if not its superior; and this method should only be applied to seedlings, where pitting is impracticable. The trees, when removed from the nursery, for the purpose of being finally transplanted, should be distributed through the ground in lots, and laid in by the heels, or "shouched"—that is, temporarily covering the roots with soil—so that a succession of trees are constantly at hand previous to their being planted. The oaks should be partially divested of all strong tap-roots; not in a way which I have seen practised, which was to lay old of as many trees as one hand would contain, laying the roots on a log of wood, and cutting the tap-roots through with a chopper; but with a sharp pocket-knife prune them near to a lateral root. I by no means recommend the pruning of resinous trees, although I have so operated on young larch. Previous to their insertion in the ground, the trees in question

were branched to the roots in such a manner that it was impossible sufficiently to tread the soil around the stem without separating a portion of those branches. In all similar cases take off the branches, to a height of three inches. The size of trees should be influenced in accordance with the nature of soils which are to receive them. It may be said generally that the hard-wooded trees being transplanted, they should be from twelve to twenty inches in height, and well rooted; and those of the resinous kind, from one year to three years old from the seed. In commencing the work of planting, set the whole of your men to work at the operation of pitting; save one, somewhat more experienced, to mark out the pits; when he proceeds with equal step to remove, with the aid of a planting-mattock, a portion of the surface, without paying any regard to lines, but to exercise all possible irregularity in that respect; the men following after separate from the surface, where the pit is to be made, any coarse herbage which may be collected. When the pits are dug uniformly, in all ordinary cases they should be fourteen inches in diameter by twelve inches in depth. Should the area to be planted be extensive, breaks (?) may be taken to and fro, and long poles used to guide in the operation. When a sufficient number of pits are prepared, insertion of the trees may be commenced, beginning with the hard-wooded trees, in their distribution, placing them from 9 to 10½ feet apart,

the planters each having a boy for an assistant. The mode is as follows: The boy takes a tree in his hand, and holding it erect in the centre of the pit, if the planter sees that it is at a proper depth—which should be for the uppermost roots to be an inch below the surface—he puts in a small portion of the finest soil to the roots, the boy carefully moving the tree perpendicularly and very slightly up and down, assisting the soil to intermingle amongst the roots. The planter then adds the remaining soil, with the exception of a little, which is reserved for the purpose of top dressing. At this stage the boy may leave the tree to the planter, whose duty it is lightly to tread over and finish. If the situation be much exposed, as a preventive of injury to the tree from the action of the wind, a solid piece of earth, if the soil is stiff, may be placed against the stem, opposite to the exposed side. After that the hard-wooded trees are disposed of, the vacant places may in like manner be planted with Norway spruce, larch, and Scotch firs, which constitute the nurses. Where planting is extensively practised, there should be an experienced foreman constantly on the spot where the operations are being performed, to see that the work is executed in the best possible manner. W. KERR, WHITEHILL,

Lasswade, near Edinburgh, Nov. 8.

—Gardeners' and Farmers' Journal.

THRASHING BY STEAM.

The following statement has appeared in the *Norwich Mercury*:—

"THRASHING BY STEAM.—TRIAL.—MESSRS. HOLMES V. MESSRS. SPARKE.—It having been almost generally made known to the public that two steam thrashing-engines were agreed to be worked in competition with each other on Monday last, one on each side of a large stack of about 37 loads of wheat-sheafs, at Mr. F. Holmes, of Tivetshall Hall, Norfolk, a great number of farmers and others, from several miles round, were assembled to witness the contest: the Eastern Union trains also left a great many passengers at the Tivetshall station during the day. An engine-drum and straw-shaker were supplied by Messrs. Holmes and Sons, Norwich; the other by Messrs. Sparke and Co., Norwich. The forenoon was very rainy, and they could not commence until about one o'clock, when the engines were both lighted at the same time, and commenced operations at a quarter past one. Both engines started together (it was agreed to stop them both at the same time), the one supplied by Messrs. Holmes and Sons performing its work in a very splendid manner, to the satisfaction and admiration of Mr. Holmes, at the Hall, and the numerous farmers and tradesmen met to witness the contest. After 3½ hours' run, including the stoppages occasioned by Messrs. Sparke's engine, the run ended. Sparke's having entirely lost its breath, or could not make steam, the engine had to stop for the same cause four times in the 3½ hours. Each engine had 5 cwt. of coals weighed off at the beginning. At the finish the coals consumed by each engine was as follows:—Holmes and Sons, five-horse power, 2 cwt. 3 qrs. 10 lbs., thrashed 42 coombs; Sparke and Co., five-horse power, 4 cwt. 3 qrs., thrashed 28 coombs. The company were highly gratified by the trial."

We have no doubt that the above account is perfectly correct, and, as regards the comparative merits of the competing engines, quite satisfactory; it is, however, of importance to the farmer to know whether the best of these engines is as good as the manufacturing talent of the day can supply. We wot not.

The quantities of wheat thrashed by Messrs. Sparke and Holmes' five-horse power machines are respectively 28 coombs and 42 coombs, in 3½ hours; being equal, for the former, to 7½ coombs, and the latter about 11 coombs per hour.

On comparing this statement with trials of thrashing-machines, made *years* ago, it would appear to indicate a retrograde movement in this department of agricultural machinery, for we find, on reference to the Royal Agricultural Society's report in the year 1840 (ten years since) that a four-horse power machine of Messrs. "Garrett's" make, Leiston, Suffolk, worked by four horses, thrashed out 15½ coombs of wheat in the hour, at the Cambridge Meeting.

Such a conclusion, however, would not be correct. The labours of the Royal Agricultural Society have been crowned with more success than the result of the trials of Messrs. Holmes and Sparke's engines and machines would lead us to expect.

"Holmes'" engine and machine appear to have thrashed 42 coombs of wheat with 318lbs. of coal, or 7½lbs. of coal per coomb; and "Sparke's" 28 coombs with 532lbs. of coal, or 19lbs. of coal per coomb. We

are in a situation to prove, on the authority of practical farmers who have Messrs. Garrett's prize steam engine and thrashing machine in use, that they can thrash out 15 coombs, or $7\frac{1}{2}$ qrs., of wheat per hour, *shake the straw*, and *riddle the corn*, with one of their five-horse engines, which consumes 70lbs. of coal per hour in full work.

Comparing this with the Norwich machines ($3\frac{3}{4}$ hours), we find that 292lbs. of coal (including getting up the steam) would be required to thrash out 56 coombs, which is equal to $5\frac{1}{4}$ lbs. of coal per coomb, showing the differ-

ence indicated in the following table in favour of Messrs. "Garrett's" engine and machine :—

	Coals consumed per coomb.	Corn thrashed per hour.
Sparkes.....	19 lbs.	$7\frac{1}{2}$ co.
Holmes.....	$7\frac{1}{2}$ lbs.	11 co.
Garrett.....	$5\frac{1}{4}$ lbs.	15 co.*

We believe it is no exaggeration to state that, with the quantity of coals used by Mr. Holmes' engine, double the quantity of corn is *commonly* thrashed out by Garrett's engine and machine, now used in Suffolk.

AGRICULTURE AND THE RURAL POPULATION ABROAD.

[FROM THE SPECIAL CORRESPONDENT OF THE MORNING CHRONICLE.]

FRANCE.—No. II.

LA BASSE NORMANDIE.

Rouen is the centre of a cider country, although not the great cider country of France. The cultivation of the vine, as a wine plant, ceases about half-way between Paris and the ancient capital of Normandy, and an inferior cider and a light watery beer form the common beverages of the work people in the department of the Seine Inferieure. But the district, *par excellence*, of the orchard and the cider-press is that fair, fertile, and English-looking country which stretches away upon the left bank of the Seine to the south-west, clothing a broad and smiling province with rich corn fields and meadow lands, overshadowed by the verdure of millions of apple trees—the ancient story of the land written in the scattered feudal ruins and venerable abbeys which rise, thickly sprinkled, on its green plains and its woody heights; and the present industry and comfort of the people evinced by the numerous busy little manufacturing towns snugly nestled on the banks of the valley streams—by the comfortable cottages of the peasant proprietary, which are here less huddled together into villages than in other parts of France—by the decided improvement which speedily becomes apparent in the breed and style of rearing cattle, and by the change, also for the better, which the eye soon catches in the extent and substantiality of the buildings attached to the larger descriptions of farms. Through this green and pleasant land, I took my way from Rouen, pushing on by Elbeuf, Brionne, and Liseux, for Caen, the ancient chief city of La Basse Normandie.

The road passes through several of those great forests, in which so much of what might otherwise be rich arable land is necessarily wasted to provide the requisite supply of fuel for the people of France. The forests of Rounray and De La Londe, the principal of those traversed by the Rouen and Caen road, are both of them state property; and, of course, they are cut and replanted upon the most rigid system. There are few or no old trees to be seen; no massive, gnarled, and twisted veterans, flinging out their grey moss-grown branches above the brighter green of younger timber. The

general aspect of the forest is that of luxuriantly thriving coppice-wood, clothing a fine undulating country broken into numberless valleys, ridges, and dells, through which the road winds, so as to afford, at every fresh turning, delicious green-wood glimpses, peeps through shady forest vistas and down coppice-entangled ravines, clear brooks gurgling freshly beneath the trees, crops of gently waving lady-fern everywhere crowning knoll and ridge, patches of purple heath showing brilliantly amid the wilderness of green, and clustering honey-suckle clinging to stem and branch. *Apropos* of these firewood forests, I am informed that in country towns and the larger class of villages it is very common for the poorer people, instead of buying fagots for themselves, to purchase the fuel they require for cooking from the bakers—who manage their ovens so as, instead of utterly consuming the wood employed, to preserve part of it in a half calcined state, which, under the name of braize, they retail to their poorer customers. I was assured by a tradesman in a small Norman village, that the quantity of braize consumed in his family during the summer—of course merely for cooking purposes—he could purchase for two sous daily. The arrangement, he added, was a capital one for all parties. Cooking by braize was much more economical, especially for stews—the cardinal point of the French cuisine—than dressing meat over flaming wood; while the baker, in turn, thus managed to get his fuel almost for nothing.

Leaving the forests behind, we enter upon the region of corn and apples. Hedges are occasionally to be seen marking out the extent of orchards, but they seldom cross into the fields. Everywhere, however, you have the apple tree—now ranged in long files across the arable land, the rows crossing and re-crossing each other—now scattered in little groves and clumps at random amid the corn. The *pommiers* are in general small trees, with crooked stems and a wide branching top. The various props with which the boughs,

* Including shaking, straw, and riddling.

and sometimes the trunks, are furnished, sufficiently prove the care taken of the trees, and the weight of the crops which sometimes bend their branches down. When cows are turned out, as they frequently are, to feed in the orchards, they are so martingaled with ropes and straps as to prevent their turning their attention to the apples which hang above their heads, and which would be otherwise far more relished by them than the short and coarse herbage beneath. In answer to my inquiries, I was informed that no appreciable injury was done to the corn growing beneath the shade of the apple trees, and that it generally ripened as soon and as well as did the grain in the more open portions of the field. In no respect could I observe, as I traversed league after league of corn and cattle land, any improvement in the style of agricultural implements. The wheels continued to cling to the plough; the harrows, with perhaps here and there an exception, had still wooden teeth; and of more scientific and advanced rural mechanism there was not a trace. The cattle, however, rapidly improved; the scattered houses, although frequently built of such rude material as wood, clay, and thatch, seemed on the whole superior to those I had left behind; but we come fairly, in Lower Normandy, on the fine old characteristic farm-yards—huge masses of grey mouldy old masonry, often crowned with a lofty oblong tower, a high slated and peaked roof, and a rusty weathercock. I remarked the vast number of cottages on the wayside which have signs denoting to thirsty wayfarers that cider and other potables might be had within. The fact is, however, that almost every cottager being an apple grower, he is glad to avail himself of all manner of opportunities for getting rid of his wares—selling them by wholesale, if he can, to dealers in towns, or disposing of the surplus by retail in his own house. A distinguishing feature of French farming is the general practice of housing hay, grain, and so forth, piling it up under the projecting eaves of clumsy sheds called *remises*, instead of stacking it neatly and compactly in the open air. A French stack, when such a thing is to be seen, is, indeed, often a geometrical curiosity, partaking of every conceivable mathematical shape, leaning with perverse ingenuity to every side of the compass at once, and altogether, in its bulging and rugged outline, resembling rather a picturesque agricultural ruin than the symmetrical piles we see in our own farm-yards. I may add, that many of the small farm-houses in Normandy have ovens attached to them, and that, as usual in France, especial care seems to be taken to place the dunghill as close to the doors and windows as possible. So far as I could make out the system of rotation of cropping adopted, its main point appeared to consist in having the ground for two years under grain, and then suffering it to lie for a year fallow. The fields are certainly, however, manured with exceeding care. I frequently observe stable-litter spread upon the ground with a degree of almost mathematical accuracy between the heaps, and guano appears to be creeping into use. About Mantes I observed posters lavishly displayed in the villages, calling the attention of "*Messieurs les Cultivateurs*" to the

advantages of "*Guano de Perou*." I was somewhat astonished, therefore, in Lower Normandy, at finding the farmers to whom I put the question quite ignorant of the virtues of the celebrated compost.

I have mentioned the improvement in the breed of cattle which obviously takes place in Normandy. The change for the better is by no means limited to oxen and cows. The sheep, although in this department there is still great room for improvement, looked less razor-backed than their brethren to the eastward; and the horse in the pastures of Normandy appears quite a different creature from the clumsy pot-bellied animals which pass themselves off as belonging to the equine race in many parts of France. The French cavalry draw their principal supplies from Normandy, and the consequence is that a curiously great proportion of the animals ordinarily used down in the west are brood mares. It is common to see in the Norman towns parties of cavalry soldiers—from the farrier's department probably—upon a species of recruiting duty, but enlisting four-legged instead of two-legged aspirants for military glory. The best breed of Norman cattle are beautiful creatures, of vast size and girth—deep and broad in the chest, small in the head, and sleek and smooth in the hide. Wander amid the orchards, or the rank meadow pastures, skirted by double poplar avenues, which bound the quietly flowing pastoral streams, and you will continually come across cattle pictures which Sidney Cooper would love to copy. For the pigs I can say little favourable; they are leggy, unthrifty-looking brutes, apparently of a breed akin in some of its distinguishing features to our Berkshire variety. Mr. Pusey, however, will not have his laurels torn from his brows by all the occupants of all the sties in Normandy. The sheep, like the pigs, have too long legs and too long tails to be orthodox creatures in the sight of a regular English breeder. I was first struck with the singularity, to an English eye—although, after all, it is the ancient Oriental fashion—of the shepherd leading instead of driving his flock. Stalking solemnly along the hollow lanes, or over the bright turf-tufted knolls, the guardian of the *moutons* led the way, his bleating charge following timidly, and closely imitating all his accidental detours, in the rear. One of these men, to whom I spoke, was accompanied and helped by one of the most intelligent-looking dogs I ever saw. Our Scotch shepherd's dog, although a creature of high sagacity, hardly carries his wisdom in his face. Until you are intimately acquainted with the colley and his many excellent qualities, you will scarcely discover the shy and bashful look of good sense and keen appreciation which he conceals beneath the shaggy hair clustering round his eyes. Not so, however, with his Norman cousin. The animal was some cross of the breed commonly known in England as lurchers; and the quick sparkle of his eye, and the ready and eager intelligence of his face, as he watched his master and flew round and round the flock at the slightest gesture or merely mumbled word of direction, were really beautiful to see. The shepherd told me he was a most valuable dog. He would not sell him for 200 francs. I observed, however, that he appeared to bite the sheep. Only

very slightly, his master replied, and that only about the legs—he neither spoiled wool nor mutton. This shepherd, like most of his brethren, was a miserable-looking object enough. His blouse was a mass of faded rags; and although he never seemed to leave off knitting coarse worsted stockings, he wore none himself, his feet being inserted in huge sabots garnished inside with straw, bunches of which hung loosely about his ankles. An odd part of a shepherd's duty in France is to sleep in the fields close to the fold, in a little moveable shed or house perched upon wheels. The structure is about as long as its occupant, and perhaps three or four feet from the floor to the ridge of its lead-lapped roof. Inside, the affair is made up into a sort of berth, not unlike a crib on board ship; and from small oval windows fitted with wooden slides, the occupant can send the gleam of a dark lantern on all sides of the field. This pastoral watchhouse is furnished with trams, by means of which a horse can drag it about at pleasure. The shepherds of the north and west of France, said an old peasant to me, are very different men now-a-days from what they were in the old times. Then they were the cattle doctors of the district—looked up to by the farmers, and even by the great seigneurs, as the only men who understood the ailments of horses and oxen, sheep and swine. Nor was their practice confined to veterinary pursuits. Constantly in the fields and pastures, they were believed, and often perhaps with justice, to have acquired profound knowledge of the medicinal qualities of herbs. They prepared and sold embrocations and physis distilled from simples; and sometimes it was even said that their botanic knowledge was turned to mystic account, and that many a love philtre and potent charm they disposed of, expressed from plants of magic virtue, duly gathered at the planetary hour. "In those days," added my informant, "the shepherds were more respected than the priests are now."

Throughout a great part of Lower Normandy the making of pillow-lace affords pretty constant employment for the women, who are consequently less in the fields than the great majority of their peasant sisters throughout France.

In the environs of Honfleur and Caen, I had frequent opportunities of noticing the domestic condition and household furniture of the people. With some exceptions I found the cottages miserably ill-contrived and ill-built, and kept and furnished in a slovenly and poverty-stricken manner. There seemed to be, indeed, a decided change for the worse in the abodes in the vicinity of the towns, from those scattered amid the orchards and pastures of the open country. One room generally served for all purposes, often containing two or three beds, some of these sufficiently dirty and rag-like; and where the beds in France are bad, we may be pretty sure that real pinching poverty reigns in the household. The furniture in such places was frequently composed of a parcel of tottery old stools and broken chairs; a maimed old cupboard or so, set out with a scanty show of plates and coarse glass: a couple of barrels were often to be seen in corners, destined to hold the coarse provisions in use; and the floor was generally either

of earth or bricks, partially broken and scattered. A close fœtid smell was frequently observable. One house which I observed was both a dwelling-place and a blacksmith's shop. The bed stood beside the forge; and in several cottages suspicious-looking heaps of straw lay in corners. This, however, is the darkest side of the picture. Every one who knows anything of the habits of a rural population is aware that misfortune or temporary loss of work inevitably drives masses of the people to settle down in or around the neighbouring towns, and very often to drag out a poor and precarious subsistence there. In the country in this part of France you may often see dirt and untidiness around the houses, but seldom squalor within them. The people are in many respects exceedingly nice in observing the comfortable decencies of social life. I have frequently observed a clean white cloth laid for dinner in cottages belonging to a class of the population who in England would have as soon thought of dining off gold as diaper.

I have mentioned the great scale upon which farm-buildings and farm-yards are frequently constructed in Normandy. These places have quite a character of their own. You approach them, perhaps, through shady hollow lanes, crowded with shaggy and untrimmed hedges, and stretched over by fine beech, elm, or poplar trees, through the clustering foliage of which the sun-light comes sprinkling down upon the rough cross road, whose ruts would make very good Lilliputian ravines. As you saunter along, the beat of the flail comes monotonously upon the ears, and then perhaps, at a sudden turn of the dry and dusty way, you see embosomed amid fine old branching trees a pile of dark grey stone and slate of formidable dimensions, surrounded by flanking walls over which grapes or peaches cluster temptingly. A *porte cochère* of superb dimensions breaks the massive wall and ushers you into the vast and rudely-littered farm-yard. In nine cases out of ten, the dwelling-house will form one side of the quadrangle, and it is often a faded, cold-looking structure, its once gaily painted shutters and Venetian blinds bleached by sun and rain. Opposite to it, built of rough stone and clay, will be a great range of barns, with lofts and gaping windows approached by ladders. On one side you observe the *remise*—a low-eaved open shed—the wooden roof supported by unpainted blocks of timber, and more or less filled with high-wheeled carts, lumbering gigs, and piles of spades, harrows, and hoes, often roosting places for the poultry; while opposite, and completing the square, we have perhaps the stable and the byre, the unlatched doors swinging open, and fine groups of cattle quietly chewing the cud before them. The whole place will most probably be piled with litter. Ducks will be gabbling over a central pond of green and scummy water, while cocks will be crowning upon "middens," the intense "sappiness" whereof would have delighted the heart—while still in her unconverted state—of the fashioning Mrs. Maclarty. The litter, the untidiness, and the generally apparent absence of method and science, are unhappily by no means exclusive Norman or French characteristics; but the vastness of the area of such places, the sombre massiveness of

the building—made more apparent by the silence and solitude which sometimes seem to brood over them—all these give the old-fashioned steading a quaint and solemn air, which can hardly fail to impress the English Rambler. Not, however, that this description holds good of all Norman farmyards. Some of them again consist of scattered buildings, wide-eaved *remises*, and roughly constructed stables, sprinkled here and there in the midst of a shady orchard, as if not an acre of land could be spared from the all-important purposes of the cider manufacture. It was at an establishment of this latter kind that I saw the best specimens of a Norman apple-crusher and cider press.

On my banging a heavy iron hammer against a bleached outer door, big enough to allow a train of hay to pass in, Madame la *Fermière*, a stout comfortable dame, appeared, and on hearing my application to see their *pressoir*, wished to know what quantity of apples I had to grind. Being set right upon this head, she led the way to the stable, or the cow-house, or both, where Monsieur le *Fermier*, mounted upon huge sabots, was engaged in a most odoriferous and Augean task. With courteous civility, however, he flung aside his pitchfork, despatched a shock-headed peasant boy for the necessary key, and speedily ushered me into a low semi-under-ground room, surmounted by a loft for storing apples, in which the apparatus was situated. The machinery consists of two distinct parts; the first for the preliminary crushing, and the second for the final squeezing of the fruit. The former is nothing more nor less than one of the mills worked by horse-power, in which the animal draws one or more stones rolling behind him in a circle. The stones—they were two, one before the other—were, however, in the present case, wooden ones, being heavy rollers, formed from the trunk of a large hard-wood tree. They revolved in a sort of circular trough of granite, about two feet deep and as many wide. Here the fruit received its preliminary dislocation. A stout Norman horse pulled the machine briskly round, and the rollers went crushing and squeezing over the sputtering, splintering, apples. They were then transferred to the *pressoir*. Fancy a strong wooden platform, some six feet square, constructed over a bricked pit or trough. Fancy over head a frame work, with powerful screws and boxes, so constructed as to bring down towards the bottom platform, with almost irresistible force, a corresponding top-plate attached to a huge wooden perpendicular shaft, set in motion by means of a strong side capstan. The apples crushed from the mill would be piled upon the lower platform; the capstan would be manned by half a dozen lusty Norman labourers, and then, with every tug and wrench, down into the yawning vat below, would pour the creaming sparkling juice. When I saw the place it was filthily dirty, and the ear-wigs, slugs, and snails which crawled about the brick-work of the vat were not suggestive of pleasant associations to the cider drinker. A grand purification, however, takes place every year before the process of squeezing and fermenting begins.

The cider made in Normandy is a hard and very acid drink, with a slight bitter in its flavour, and altogether it is a beverage which palates and

stomachs unaccustomed to its qualities find some difficulty in liking. The native population, however, swill it down at a most alarming rate. Morning, noon, and night, cider, either *gros* or *petit*, is in constant demand. The former species, the *gros*, answers to our double stout; while the *petit* stands instead of our light table-beer. The difference is made by the simple and satisfactory operation of adding water in the proportion denoted by the phrase that *petit cidre* means *gros* "cut in half." The latter kind is the stuff principally consumed in cabarets. The former figures in the big-bellied and wide-throated carafes of cafés and table d'hôtes. The crop of apples, although it appeared to me a capital one, was stated to be very defective in comparison with that of last year, which was first rate. Two very fruitful seasons seldom, however, occur in succession; and last year so plentiful was the flood of juice expressed, that a quart of the strongest cider might have been bought for a single sous.

Proceeding in a north-eastward direction from Caen, we begin to observe, as we approach the embouchure of the Seine, a new and not unimportant element of local prosperity, in the rearing of immense quantities of poultry—fowls, ducks, geese, and turkeys—principally for the purpose of exporting their eggs to the London market. The breed of these birds struck me as being particularly large and handsome. For miles and miles the country is alive with them, and according to the last published statistics from 7,000 to 8,000 dozens are weekly despatched to England.

Crossing the Seine, and leaving the department of the Calvados for that of the Seine Inferieure, I was anxious to pay a passing visit to one of the small country towns situated in the fertile table land of the Pays de Caux, and containing a number of weavers, engaged principally in the manufacture by hand-looms of various descriptions of cotton fabrics, the material being supplied to them by the great cotton establishments of Rouen. With this purpose I soon found myself wandering through the quiet narrow streets, and presently amid the pleasant rural lanes, beautifully wooded, which skirt the capital of the joyous monarch renowned in Beranger's song, if nowhere else—*Le Roi d'Yvetot*. So far as the rich corn-land went, the clumps of thriving coppice wood, and the solemn rows of massive old elms, one could imagine oneself in England; and the similitude was in no way damaged as I stood in the shade of a splendid hedge crowned with reverend trees, and listened through the leaves to the mingled rattle of the shuttle, and the beat of the flail. I thought of the fair Yorkshire solitudes—half rural, half home-manufacturing—of Saddleworth. A glance at the houses, however, flung the phantasy to the winds: they were quaint and quite peculiar, built of upright beams of timber filled up with clay—the latter painted white, the former black, giving each wall a curious striped appearance. In the majority of cases—I am now speaking of the suburbs of Yvetot—the double rural and manufacturing character of the dwelling was obvious. The lower portion was used as the living and working rooms, the upper as a granary or hay loft, the latter generally approached by a

ladder and a small door placed at the gable, underneath a very widely projecting eave. The windows of these abodes were odd affairs, frequently consisting of a longitudinal row of single panes of glass placed between the perpendicular beams, somewhat in the style of port-holes. In houses of the better class the looms were erected in sheds; the poorer class of weavers worked by their beds and hearths. Cotton hand-loom weaving is exploded in England, and would probably be so here were it not that in many instances the workman is also the proprietor of a small patch of ground, so that between the shuttle and the spade he contrives to scrape together a living. The weavers in Yvetot who have no freehold are, as might be expected, miserably poor—some of them, I was assured, earning no more than four or five francs a week. A good artisan at the best work, labouring twelve or thirteen hours a day, may manage to scrape together ten francs by the end of the week. Of course all hands in the family, capable of toil, are set to work. The women wind and reel, and with the boys drive the shuttle, to make the coarse and

inferior kinds of stuff. Some of these latter, I was informed, could be, and were, as well woven by boys of 14 as men of 40. Nothing but poverty and misery can come of such miserable handicraft. The farming avocations of many of the people soften down what would otherwise be the darkest features of the picture. In one workshop, for instance, which I inspected, there were stowed away a half-dozen goodly easks of cider, while near a score of canaries fluttered and chirped in an aviary by the long row of windows. But the weaver here was a landed proprietor as well, and he told me that he lived upon his money when the revolution stopped the work, and when hundreds of the poor Yvetot weavers were working upon the roads for twelve sous, or 6d., a day. One almost regrets the existence of any landed system which has the effect of encouraging the people to eke out their living by devoting themselves to a miserable mindless occupation, requiring neither ingenuity, strength, nor skill, but a forlorn species of mechanical patience, in driving everlastingly, to and fro, the weaving shuttle.

THE MEAT TRADE IN PARIS.

BY M. A. POMMIER.

[We are not quite clear who the authorities are to whom allusion is so often made in the following article, but we believe they are the municipal authorities of the city of Paris; if so, their management in the rules and regulations of the meat markets are as little satisfactory to consumers and graziers as that of the corporation of the city of London. Like causes produce like effects; there as here, a cry is raised to "get rid of all this old system of taxes, clogs, and regulations." Here the city authorities propose to increase the taxes (i. e. tolls).—ED. F.M.]

The fall in the price of meat at the markets of Sceaux and Poissy, still continues. When Paris requires 10,000 sheep weekly, and the markets are supplied with 20,000; when there is a demand for 3,000 oxen, and a supply of 6,000; it is evident that prices cannot be maintained.

Added to which, the consumption of meat diminishes, from the concurrence of general and particular causes.

It is doubtful whether the population of Paris is as great now as it was before the revolution of February; and in all probability it is not in that state of comfort which is favourable to consumption.

And, further, the supplies of fish and poultry are considerable. If 60,000 kilogrammes of fish come in in one day, this article of food may be calculated as supplying the place of meat at least kilogramme for kilogramme, which is equivalent to 175 oxen. Poultry is not dearer than butchers' meat.

And yet meat has not much lowered in price at the butcher's stall. The authorities make this a ground of complaint against the Paris butchers. But who are the real culprits, the butchers or the municipal authorities? The butcher exercises his calling under conditions to which the municipal authorities have sub-

jected him. The butcher sells dear, if he can, as every tradesman tries to do. To take advantage of circumstances is, to all appearance, the law of commerce.

The butcher's trade profits by the habits of the citizens of Paris, who seldom beat down the price at the stall; it profits by its monopoly; it profits by the barriers opposed to the free circulation of meat, by the octroi and the regulations which prevent free trade in meat. It is too simple even for the authorities to believe that the butchers of Paris should play the part of philanthropists; the butchers of Paris do the best trade they can, just as the authorities get the most lucrative appointments they can.

Do not believe that this state of affairs, so deplorable for agriculture, affects the authorities much. Will they understand at last that the time has come when the trade in meat should be free; that the octroi duty of six centimes levied on a pound of beef, which is sold for 25 centimes wholesale, of third quality, is monstrous; that it is absurd to limit the number of the dealers in meat; and that all these old rubbishing laws and regulations should be abolished?

But it is the fashion to regulate everything, to have a hand in everything. The authorities have more talent than all the world besides: we are under tutelage, and it is their duty to lead us; they believe so sincerely.

The Paris market is a sort of trap, where meat is caught. Everything arrives there on payment of the octroi; but, to get out again, you must lose the octroi. The treasury returns to the cloths what it made the wools pay; to the calicoes what it made the cottons pay; to refined sugars what it made the raw sugars pay, when these manufactures cross the frontier. But for meat, an absolute necessary, nothing is returned at the

barrier; and when the consumption does not increase, so much the worse—the meat must either spoil or be sold for nothing.

These laws and regulations, these barriers and clogs, impede the freedom of commerce, which knows well where to find a market when it is left unrestricted.

Meat is dearer without the walls of Paris than within. It is sold wholesale at a higher price; but you cannot purchase in Paris to take it through the barrier, under the penalty of losing six centimes per kilogramme for the octroi.

However, it may as well be plainly stated, the authorities will be defeated; the trade in meat will be carried on in spite of them. The authorities prohibit the hawker from offering meat for sale at private houses; and yet, despite a host of persons employed to prevent hawking meat, there is not the less hawking. There will be chamber butchers, as they cannot sell in a shop; and, in spite of the authorities, the end of it will be that the public will profit by the cheapness.

This is the point to which things are being driven by the present system. At any rate the surplus must be disposed of; and, in spite of laws and regulations, a market will be sought by every means. It is clear that when there is an abundance, consumption must be increased: that is a necessary consequence. If the supply is stationary, there is no longer a surplus.

It appears that at the regular markets there are some good people who charge the sales by auction with causing the low prices. "I cannot buy of you," the salesman will say, "on account of the auction. The sale is bad; it is the fault of the auction." And as people are always to be found who, perceiving not the true reasons, adopt any which are offered, we

hear it constantly repeated, "It is the fault of the auction."

Now, at this poor auction about 15 oxen, 100 or 200 sheep, and 50 calves are sold daily; and by this means they would have you believe the sale of the 2,000 oxen and 20,000 sheep which go to Sceaux is prevented.

The fact is, that the auction, on a larger scale, would take away the trade of the salesman, which has a tendency to change hands, and is passing insensibly into the hands of those graziers who have the spirit to send their cattle to the auction. That is the truth; and hence the indignation and petty tactics practised at Sceaux and Poissy.

This is contemptible. Instead of addressing the authorities, who neither will nor can do anything, which may be very easily understood when attention is given to the subject, the farmers should have recourse to the means they themselves possess. Does the grazier consult the authorities as to the mode in which he should fatten his ox? I should suppose not. No more should they be consulted when the question is, by what means to sell the ox that has been fattened.

The farmers should unite and well weigh their situation, irrespective of the authorities; who, after all, are only the receivers of the funds raised by our contributions; see where markets are to be found, what are the obstacles to consumption, what laws restrict it, what taxes overburden it; and it may readily be expected that, after such an investigation, they may, through their Representative Chamber, easily get rid of all this old system of taxes, clogs, and regulations, which has but one merit—that of providing for several hundred employés, interested in its preservation.

Nov. 3.

GLEANINGS IN AGRICULTURE.

Glyceria maritima, *Poa* and *Hydrochloa maritima* of authors (Sea Marsh *Glyceria*).—This grass is found by the sides of rivers and in marshes by the sea. It should form a small portion of the mixture for water meadows. The root leaves are fine, forked, and rolled inwards; root creeping; a perennial; in flower from July to October.

Poa rigida, *L. Sclerochloa rigida* of Beau; (Hard Sweet-grass).—The scantiness and poverty of the herbage of this grass render it totally unfit as useful food for any animal. Found on dry gravel banks. An annual; in flower in June.

Glyceria procumbens or *Poa procumbent* (Procumbent sea Sweet-grass).—This is one of our scarcer grasses, whose habit and size do not render it very conspicuous. The inner surface of the leaves are roughish, the outer ones smooth. The natural habit of this grass is to be recumbent, but its flowing heads tend upwards from the higher points. In dry situations this plant is found about four inches high, but in moisture it assumes a greater altitude. It has a remarkable attachment to saline earth, and will exist in situations wherein scarcely

any other plant could. An annual, in flower from July to August.

Poa alpina (Alpine Meadow-grass).—This is a common grass on the mountains of Scotland, affording a grateful mouthful to the Highland sheep. Sinclair says, at the time of flowering the produce from a light sandy loam was 5,445 lbs. per acre. Hares and rabbits are particularly fond of this grass. A perennial, flowering in July and August. There is an uncommon tendency in this *Poa* to become viviparous, and is then by botanists called *Poa alpina vivipara*.

Cattle fed on sour food, prepared by fermenting rye-flour and water into a kind of paste, and then diluted with water, afterwards thickened with hay-chaff (that is, hay cut small) are said to fatten quickly. This plan is adopted in France to a considerable extent, and has been introduced years ago into this country. Although not generally adopted, it is deserving of consideration by graziers. With respect to the efficacy of acid food for fattening animals there is, as on most other subjects, a variety of opinions. It is well known that swine derive more benefit from sour milk than they do from milk in

a fresh state; and there is no doubt but there are particles which promote digestion and facilitate the consumption of a larger quantity of food, and consequently expedite the fattening of cattle.

Stall-feeding.—It is too common a practice in stall-feeding cattle to give a certain allowance every day, without regard to any circumstance; but this is altogether wrong. It is not, perhaps, generally known that a fattening beast will eat with a keener appetite on a cold day than in warm, damp weather; therefore, his food ought to be given accordingly, for by giving the same quantity every day the animal in a measure becomes cloyed, and his appetite impaired, and consequently the food is wasted. No more should be given at one time than the animal can eat readily, for it is much better and far more profitable to give little and often, according to the state of weather, &c.

Gas-tar.—There is great difference of opinion with respect to this substance as a manure. Our own experience leads us to think favourably of it. When mixed with sand or soil before being used, it is an excellent manure for parsnips, carrots, and turnips. It is powerful in its effects, from its containing carbonate and acetate of ammonia. It should be spread evenly over the ground. I will here also add the experiments of a Mr. Bowley with gas-refuse, as it may prove of service to some of your readers, as it has to the writer. He says ("Sidington, Glouc.," *Farm. Mag.*, vol. ix., p. 197): "I have long used the refuse of the gas-house as a manure. My usual practice is to form out my compost-heap with long dung about three feet thick, pour the coal-tar regularly over it, then put another layer of dung or turf, throw up the lime on the top; allow it to remain in this state two or three months before it is turned. The lime should not be under the tar in the first instance, as the tar will find its way through the dung, and unite with the lime into a hard cement, in which state, even when with considerable labour it is broken into small particles, I believe it to be of little service on the land. After pursuing the above system for some time, I resolved to try some experiments with each in its unsophisticated state. I accordingly commenced with the tar, which I poured out of a watering-pot in a small stream regularly over about half-an-acre, in a field of rye-grass. This was done in February, 1838. Soon afterwards, the seeds presented the rather singular appearance of having been burnt in stripes with a hot iron, for the tar had completely destroyed all it had touched; and I was told I had poisoned the land, and it would never recover itself. However, in June I noticed that the grass between the streams of tar looked more luxuriant, and the sheep fed upon it in preference to the other parts of the field. In the autumn the whole was ploughed, and sown with wheat, which looked much more flourishing on the half-acre dressed with tar than anywhere else. The difference was so conspicuous on the first, that the most casual observer could not pass without remarking it; and at the present time (August, 1839) there is a heavy crop on it ready for the sickle, while the rest of the field is light, and will not be ripe for a week or

ten days. I put some tar in the same way upon a piece of land, a month before it was ploughed for spring vetches. The vetches were sown two weeks after the plough, and many of them were destroyed; but the crop of wheat which succeeded was benefited equally with the one in the other experiment. I have tried the lime with great advantage, putting from 12 to 15 cartloads to the acre; but I find it is better to remain a time before it is ploughed in. All these experiments were tried on a cold sandy clay, worth about 10s. per acre." Wherever gas tar can be obtained, which in many places it can for the carting away, we would recommend its general adoption as a manure, first being thoroughly mixed with some earthy substance, spread evenly over the ground, and then ploughed in.

Borage as Manure.—The good effects of this plant in a green state for manure has been long known, but it is not so generally known that it is the soda and other salts which the plant contains which renders it thus valuable as a green manure over many other plants. When full grown it should be ploughed in, and it may be sown in April, and ploughed down in August in time to be followed by wheat.

Yeast as Manure.—This substance is one of the most powerful manures in existence, that is after it has become putrid and useless to the brewer and baker, &c. It should be mixed with one-half water, and applied in a liquid state.

Coal Ashes, when kept perfectly dry, and mixed with one bushel of lime to a cartload, is an excellent top-dressing for clover on dry chalky soils, in the quantity of 50 or 60 bushels per acre. It is also an excellent manure for grass lands, which should be employed immediately after the hay crop is secured. In mixing the lime with the ashes it should be used in its hottest state, and should be turned three or four times, when the cinders or half-burnt coal, which would otherwise be of no use, will be reduced to as fine a powder as the lime itself.

Wool and Cotton.—In 1822, our woollen manufactures depended chiefly upon Germany and Spain for the large quantities of foreign wool they required in the manufacture of cloth; and at this time the whole of our imports from our colonies did not amount probably to more than 200,000 lbs. a year. In 1848, out of 62,103,000lbs. of foreign wool consumed in Great Britain, nearly 40,000,000 lbs. have been imported from the following British colonies—

New South Wales	22,091,481
East Indies	5,997,435
Van Diemen's Land.....	4,955,968
Cape of Good Hope, &c....	3,497,250
South Australia	2,762,672
West Australia.....	129,295
New Zealand.....	95,151

Total..... 39,529,252

Our largest customers by far for woollen goods are the United States of America. In the year 1848 the amount of that description of manufactures sent to those

markets was £1,720,570; in 1847, 1846, and 1845, the amounts were £2,043,000, £1,318,000, and £1,581,000, or about 30 per cent. of the entire quantity exported. Next in value to us, as markets for woollens, are the Hanse Towns (for Germany and eastern Europe), which took from us in 1848 the amount of £527,384. The quantity of woollen and worsted yarn exported in 1848 was 8,429,152lbs. In 1820, out of 151,572,000 lbs. of cotton wool imported into Great Britain, 89,999,000 lbs. were from the United States. In 1848, out of about 740,000,000lbs. imported, not less than 640,000,000lbs., nearly seven-eighths of the whole quantity consumed, must have been from the United States. Had the increased production of cotton wool in our own colonies since 1820 been going on at the same rate as that of sheep's wool has been, we should have now been importing only about 800,000 bales from America. In addition to 1,200,000 bales from the East Indies, Australia, Port Natal, and other colonies, are favourable to its cultivation.

Sheep.—With sheep, as with all other domestic animals, the first objects to be kept in view are the head and symmetry of shape, or that particular constitution and form which is found by experience to give the surest indications of an early maturity of carcass, and those pay best for the consumption of food. The sheep master, however, has a second source of profit to look to, which is sufficiently great to demand his particular attention, and that is the quantity and quality of the wool they grow. Both these properties are materially affected by the soil and situation of the land on which the animals are placed, and hence the proper adoption of the different species of sheep to the land, a subject too much neglected by many sheep breeders; which best suits them is an object of the greatest importance; so great, indeed, is this influence, that their leading distinctions are owing to it. Those bred on hilly downs or heathy mountain pastures are characterized by their fine short coat of wool, and are hence denominated "short-woolled," whilst those fed on marshy or other rich lowland pastures have a wool which is both longer and in some degrees coarser in its texture, and are called "long-woolled" sheep.

Soils.—In affording warmth to plants, the earth is of considerable importance, and the power of accumulating and retaining it varies in soils as the proportion of their constituents. Sir H. Davy found that a rich black mould, containing one-fourth of vegetable matter, had its temperature increased in an hour from 65° to 88° by exposure to sunshine, whilst a chalk soil was heated only to 69° under the same treatment; but the black mould, when removed into the shade, cooled in half an hour 15 degrees, whereas the chalk lost only 4°. This, in some measure, explains why the crops on light-coloured, tenacious soils are in general more backward in spring, and remains longer in verdure during autumn than those on black soils; the latter attain warmth more readily, and part with it with equal speed. Coal-ashes, when spread over the beds of garden crops, invariably cause the crops to appear several

days before others of the same sort not covered; it being a well-known fact that dark-coloured bodies absorb heat more readily, and in larger proportion, than those of a lighter hue; but, as has already been noticed, they part with it more quickly than the lighter.

Labour.—It is labour which puts the greatest value upon land, without which it would scarcely be worth anything; it is to that we owe the greatest part of all its useful products: for all that the straw, bran, bread, of that acre of wheat are more worth than the product of an acre of as good land which lies waste, is all the effects of labour. For it is not barely the ploughman's pains, the reaper's and the thrasher's toil, and the baker's labour, that are to be counted into the bread we eat: the labour of those who broke the oxen or horses, who dug and wrought the iron and stones, who felled and framed the timber employed about the plough, mill, oven, or any other utensils, which are a vast number, requisite to this corn, from its being seed to be sown, to its being made bread, must all be charged on the account of labour. It would be a strange catalogue of things that industry provided and made use of, about every loaf of bread before it comes to our use, if we could trace them—iron, wood, leather, stones, bricks, coal, lime, cloth, drying drugs, pitch, tar, masts, ropes, and all the materials made use of in a ship that brought many of the commodities made use of by the workmen in every part of the work.

Properties of Charcoal.—Among the many properties of charcoal may be mentioned its power of destroying smell, taste, and colour; and, as a proof of its possessing the first quality, if it be rubbed over putrid meat, the smell will be destroyed. If a piece of charcoal be thrown into putrid water, the putrid taste or flavour will be destroyed, and the water be rendered comparatively fresh. Sailors are aware of this; for when the water is bad at sea, they are in the habit of throwing pieces of burnt biscuit into it to purify it. Colour is materially influenced by charcoal, and in numbers of instances in a very irregular way. If you take a dirty black syrup, and filter it through burnt charcoal, the colour will be removed. The charcoal of animal matter appears to be the best for this purpose. You may learn the influence of charcoal in destroying colours by filtering a bottle of port wine through it: in the first filtration it will lose a great portion of its colour, and become tawny; repeat the process two or three times, and you have destroyed it altogether.

Uniting Farms in France.—In certain cantons in France, the peasants, who are the proprietors of lots of greater or less extent, rent them to some large proprietor, or some farmer, to be cultivated together. They then work on this land as kind labourers. Thus their prospect is double: they have the rent of the land and the wages of labour. The soil is subjected to a better system of cultivation, and is improved, and the amount of wealth is augmented to the advantage of all.

Milton Abbey.

J. M'INTOSH.

LANDLORD'S DUTIES.

Without entering upon the ticklish and difficult task of discussing the relative duties of landlord and tenant in the present crisis, there is in the condition and relations of both, enough to afford matter of practical interest; and at this season of the year it is invested with a peculiar degree of importance. If it be true that ninety-two millions of money are sacrificed by the agricultural classes, it is impossible for the loss of that sum not to be most severely felt, as wages and rent have not been hitherto reduced to anything like their proportion of the reduction of the price of produce. True, the landlord is suffering by the difficulty of letting his farms, by the deterioration many of them are undergoing by the limited means or selfish proceedings of the tenants; but the per centage generally returned do not represent the landlord's share of the loss. Nor has the reduction of wages bear at all commensurate with the reduced cost of living, nor the diminished value of the products of their labour. On the subject of the landlord's duties, an old correspondent thus addresses us; and the idea he gives of the means of meeting the difficulties by the landlord is worth consideration:—

"LANDLORD'S DUTIES.

"Property has its duties to perform as well as its privileges to enjoy."

"I repeat the axiom with which I concluded my last paper, as an apology for presuming to write under the present head; and I take leave to add, that while he who neglects his duties cannot reasonably claim the privileges of property, he who carefully performs those duties may confidently hope to enjoy and increase the benefits which his station offers him.

"Though the feudal system is no longer in operation, and though farmers and labourers are now permitted to think and act as free-born Britons ought to do, still the owner of an estate is not exonerated from the duty of endeavouring to promote their morality, comfort, and prosperity. In doing this he will find that he is most effectually promoting his own good and that of his successors; for in these matters especially the benefits he bestows return in blessings on him and his. The impossibility of farming being carried on in the old way is now too evident to require demonstration. Alterations must be made, rents must be reduced, and cultivation must be improved. But it is far more desirable that cultivation should be materially improved than that rents should be greatly reduced.

In some cases means may be used to bring up the cultivation to the requirements of the times, with little or no reduction of rent. In many cases a readjustment of the terms of the tenure, so as to promote energetic, first-rate cultivation, instead of the very common, cramping, discouraging tendency of farm-agreements, would be far better for a good tenant than a reduction of ten per cent. The best cultivators can afford the highest rents, while the worst are most craving for reductions, and they most effectually procure them by deteriorating the cultivation and consequently the condition and value of their farms. The duty the landlord owes to himself, his successors, his dependants, and the public, is to encourage the good cultivator by every reasonable means, and as strenuously to prevent the despoliation of the bad one. This is a somewhat difficult task, but by no means an impracticable one. The landlord, the land-agents, and the tenants should candidly consult together; and if clever and reasonable men, they will discover many and various means of obtaining the requisite result. One of the first duties of the landlord or land-agent is to prevent the common but wretchedly ruinous resort of failing tenants—the reduction of labour. This is the first step which the poor but honest tenant takes, as well as the fraudulent one, to reduce his expenditure, and at the same time the condition of his farm, and with it his own circumstances; for it is certain that the land cannot be well cultivated without a large proportion of labour judiciously bestowed upon it; and if good cultivation will not pay, bad cannot. To prevent a reduction of labour on each acre of tillage land, it may be needful either to reduce the size of the farm, or to increase the means of the occupier, or to lessen the quantum of tillage by laying down a portion to grass. In many cases where the power of the tenant is inadequate to the extent of his farm, it would be doing him a kindness to reduce it, or remove him to a smaller farm, where, if he be an energetic and skilful farmer, he will probably be enabled to grow as much produce as he did when paying more rent for a larger farm. There may very probably be a few large farms for men of large capital and great energy; but the majority of farms have been, and more especially now are, far too large for the means of their occupiers. The most common size should be moderate, and there should also be a few small farms. Much judgment is requisite in planning out an estate, so as to place the

homesteads in the most central or the most convenient places, and in properly appropriating the land to the farm-steads, and in selecting suitable tenants for the various farms. In doing this, and in some cases by multiplying the farms and building a few new small-sized homesteads for a few additional small farms, the value of an estate and the prosperity of the occupiers may be greatly increased. By means of this kind the proportion of labour may be multiplied, and the produce may also be increased in a proportional ratio; and thus, instead of industrious labourers being sent to the union-house, or driven by destitution to recklessness, they may be fully employed in promoting their own comfort and honest independence, and the prosperity of the tenant, the landlord, and the community at large.

"A. R. F."

Now we will instance, in confirmation of part of

our correspondent's views, that all the difference may in some cases be made up by draining undrained land, the following case. Take a cold clay valued at 18s. per acre, and let this be drained at a cost of say £5 per acre, by government money. The landlord pays 6s. per annum to government per acre, and so diminishes his gross receipts for the land by 6s. per acre for twenty two years. This is an extreme case, but the tenant will find less difficulty in paying the old rent for his drained land than he would at paying 12s. per acre for the same land if left undrained altogether; and the landowner will find an improved estate the result of the one process, while in the other it will be fast going out of cultivation. We are certain this is, where practicable, the best mode of meeting the difficulty.—Gardeners' and Farmers' Journal.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES' COMMISSIONERS.

(Continued.)

LEWES, SUSSEX, March.

The county of Sussex, apart from its purely agricultural characteristics, has a peculiar interest attached to it, as among its landlords are included the Duke of Richmond and Mr. Cobden. The Duke has the reputation of being a good farmer, and an encourager of improved methods of cultivation among his tenants. Of Mr. Cobden, as a proprietor, it is hardly fair to speak. His whole estate is under 150 acres in size, and more than half of it is covered with wood. The cultivated land is divided into two small occupancies, one of which is held by a miller and the other by a shop-keeper. Of course, the Protectionists of Sussex speak with great contempt of this estate, and it is certainly curious to reflect that if fate had condemned Mr. Cobden to live on and till his paternal acres, he would, in all human probability, have been at present as staunch an opponent of free trade as wheat under 40s. can make a farmer. His place is called Dunford Farm, and is situated in the parish of Heyshott, a few miles from Petworth, in a south-westerly direction. Mr. Cobden is naturally proud of the way in which he has become proprietor of this bit of land; but he should confine himself to that, in his public allusions to the subject. From fifty to sixty acres of cultivated ground, divided between two tenants, neither of whom makes farming his principal occupation, can have little in the management of them from which the agricultural classes should consent to take a lesson.

Turning from these points of personal interest to the material features of Sussex farming, it must be borne in mind that this county has, like nearly all the others which we have visited, a great variety of geological conditions, having the wealden formation in the north and east; and beds of green sand, chalk, and London and plastic clay, occupying the western and southern districts. None of the last-mentioned strata have any considerable breadth, and by far the largest portion of the county is occupied by the sands and clays of the weald, and is therefore a comparatively unremunerative description of land. To this tract the account we have already given of Weald farming in Surrey may be applied with nearly strict accuracy, the tenements being generally small; the land ill-drained, half-cultivated, and inadequately stocked; the face of the country overrun with wood, and intersected by hedge-rows; the occupiers a race, for the most part, without sufficient capital, ignorant, and prejudiced in their methods of cultivation, and usually tenants at will, though their farms may have been held in that way for several generations. Thus it happens that a large extent of country, for the improvement of which a liberal outlay both of capital and skill is absolutely indispensable, is held by a set of men, many of whom are elevated but one step above the position of the agricultural labourer; and whom, from their poverty, numbers, and their singular tenacity of grip with which the humblest class of occupants cling to the soil, it is difficult, if not im-

possible, to displace; but the evil influences to which the Weald of Sussex is unfortunately exposed, at a moment when the most favoured agricultural districts are suffering, do not stop here. In the eastern districts of the county between 10,000 and 12,000 acres are annually devoted to the cultivation of hops, upon which, as every one knows, very heavy Excise duties are levied; and a system of the most extraordinary and injurious kind has grown up with reference to this branch of husbandry. Favourable seasons, that bring a large yield of hops—thus reducing their market value, and swelling out the amount of Excise duty,—are ruinous to the grower; while seasons in which most of the crops fail, as they diminish the sum payable to the revenue, and augment the market value of hops, bring great returns to the successful grower. Thus it will be seen that a species of gambling is set on foot in the cultivation of the soil, the chances of large profits attracting many from the more healthy branches of agriculture to one where a few large prizes are occasionally drawn; and, as one evil is the prolific parent of others, so it is found here that the hop plant, which is very expensive to cultivate, absorbs all the capital of the farmers; that, being a scourging crop, it appropriates the manure which should go to fertilize the corn and green crop lands; that hardly any of the growers are enriched by it, while many are beggared, and still more kept tottering on the brink of ruin. Above all, beyond the gambling character of hop-growing itself, there is superadded a regular and thoroughly organized system of betting on the results of each season, in which nearly all classes of the community—hop-growers, farmers, brewers, corn-merchants, and traders—are more or less compromised. We are informed that large sums of money change hands each season in this way, the betting commencing as soon as the hops begin to show, and terminating when the picking is over and the crop secured. The betting always takes place on the probable amount of the “old duty” which the yield of the season will produce. This, from the precarious character of the hop plant, and its liability to blight, is subject to great variations, being, for instance, £205,556 in 1839, £34,091 in 1840, and £146,250 in 1841. The betting is carried on so keenly and with such skill, that (as an example) the week before the amount of old duty in 1848 was officially announced, it was estimated at £212,215, being only £201 short of the exact sum. Upon the evil effects of a state of things like this on the agriculture of any district, it is quite unnecessary to comment. Applied to the Weald of Sussex the results must be extremely injurious. The farmers of the Weald are, as might be expected, suffering severely at present. They have not the

wherewithal to satisfy their landlord's claim for rent; they are unwilling to stay on their farms, because every day's accumulating losses only increase the certainty of their final ruin; and yet they are reluctant to leave, because when they quit possession they have no capital to fall back upon, and must support themselves by manual labour. Under these circumstances the question arises, what is to be done with this large tract of country, which has hitherto supported a very considerable population? The solution of that question involves the vital interests of more than half the county of Sussex, and the sooner a result is arrived at by those most concerned the better. Every day's delay only aggravates the difficulty of a final adjustment.

On the Sussex Downs the cultivation of the soil and the management of stock differ in some points from what we have hitherto met with in the chalk country. On the better lands the four-field course is adopted, and this is extended to a five or even a six field (being laid one to two years to “rest”), where the land becomes thinner and less valuable. Very old-fashioned clumsy ploughs are used, made of wood, with a bit of flat wood for a mould-board, which is shifted from side to side at each turning; the beam, a thick, strong, straight piece of wood, set on to the head of the plough at an angle of 45 degrees, and borne up in front in a very solid and substantial manner on a pair of wheels from two and a-half to three feet in diameter. This implement is drawn by three or four horses, or six bullocks. Within a couple of miles of Brighton these ploughs may be seen in use every day; and we saw in that neighbourhood a working team which, for waste of opportunity, of power, and of time, could probably not be matched in any other county in the United Kingdom. At the end of a ploughed field were a lot of bullocks, all crowded together, but which we presently perceived were in the yoke, and being then turned round. Slowly the crowd separated, each team wheeling about; and steadily advancing up the hill came eighteen heavy bullocks, two and two abreast (six oxen in each plough), drawing three ploughs following each other, one man guiding a plough, while another, armed with a long pliable stick, like a fishing-rod, kept the team under his charge at their duty. The furrow was of an ordinary depth, and the land by no means very steep or heavy to cultivate. On the next farm to this we found that a well-managed dairy cow produced upwards of £20 a-year, the milk being sold in Brighton, one of the best markets in England; and here, with the command of the same market, on precisely similar soil, was the keep of six oxen lavishly expended on an operation which could have been infinitely more cheaply executed by one man and two good horses. Oats are grown

extensively, the soil being found better suited for them than barley. The wheat chiefly cultivated is a brown species, less in value by 6d. a bushel than white wheat, but a third more prolific; twenty-six bushels an acre may be reckoned an average produce. Sheep flocks are the principal dependence of the Down farmer; and on a farm of 1,000 acres, part sheep-walk and part arable, 800 ewes are considered a fair stock to be kept. They are all of the pure South Down breed, this being the county where that celebrated stock originated. On the Downs breeding flocks are kept, the lambs being sold every year, in August and September, to be fed in richer parts of the country; for this purpose many go to West Sussex, the price of lambs averaging 17s. each. Old ewes are sold for early lambing in warmer districts; the price last year was 28s. A lamb reared for each ewe is a good produce, and not often realized. The wool yielded by each sheep averages 3lb. Folding is regularly practised, much in the same way as in Dorset and Wilts; the sheep being "worked harder" in some seasons than in others. We cannot reconcile this system of "working" the sheep (such is the phrase) with that economy of food and full development of the substance of the sheep which, in other districts, is regarded as necessary to profitable returns. If manual labour were scarce and dear, and the price of mutton extremely cheap, there might be some wisdom in the plan.

In the immediate neighbourhood of Brighton we visited a farm 450 acres in extent; comprising 300 acres arable, 50 meadow, and 100 down. This farm keeps a stock of 40 milch cows and 400 ewes. The arable is managed on the four-field course; wheat and oats being grown alternately with green crops and grass. Very little barley and no potatoes are grown on the farm. The buildings contain comfortable stalls for the milch cows, well ventilated, and provided with the necessary means of economizing food and manure. The stock are kept in excellent order, and yield great returns. The cows are house-fed during the winter on carrots, mangold, swedes, and grain. They are housed during the night in summer, and tethered (!) by the head on the grassland during the day, both to make them consume the grass more regularly and because there are no fences. This is not without inconvenience, as may be easily supposed when one thinks of 40 milch cows tethered within short distances of each other, under a burning sun, without the shade of a tree, and tormented with flies. On a farm where the other operations are conducted with so much prudence and skill we are at a loss to account for such anomalous management. The sheep are folded and "worked" in the usual manner. Two horses are found sufficient for a plough; and their

draught would probably be much lessened by the substitution of a light improved wheel-plough for the cumbrous machine already described. Much care and attention is paid to the economy and accumulation of manure. It has been proved by measurement on this farm that with the litter each milch cow leaves a cubic yard of dung a-week in winter, and the half of that quantity in summer. The liquid is carefully secured in a tank, and pumped regularly over the heap to moisten and enrich it.

Great accuracy and attention are carried into the different operations on this farm, all of which are checked by a system of bookkeeping, which shows at once the loss or gain attending any particular practice. For last year the books show a very handsome return to the tenant; the balance, after payment of rent, labour, and all charges, exceeding £900. We observed that two-thirds of the gross returns were the produce of dairy stock, sheep, and green crops, the remaining third arising from the sale of corn; and these proportions tally very closely with other instances of profitable farming which have fallen under our notice. The rent, rates, and taxes of this farm amount to £600, which, considering its proximity to an excellent market, seems moderate enough. It is situated at an elevation varying from 150 to 400 feet above the sea level.

The farms within a circle of some miles round Brighton are extensive, ranging from 400 to 2,000 acres and upwards. Labourers' wages vary from 9s. to 12s. a week, and there is no lack of employment. On some estates cottage rents are 1s. a week; but in villages, where cottages are run up cheaply by speculators, 2s., 3s., and as much as 4s. is exacted.

The "custom" of the county with regard to the payments by incoming to outgoing tenants is, on the Weald, and generally in East Sussex, very much the same as that we described in our letter from Surrey. The "inventory" consists of manures and half-manures, rent, taxes, ploughings and harrowings on land fallowed for wheat, the expense of any green crop left for the incoming tenant, the growth of underwood in the hedges, the value of old lays, &c. The manures are those from which no crop has been raised; "half-manures" are those from which one crop has been produced. Lime is calculated in the same way. It is almost impossible to value with accuracy the half-manures either as to the quantity applied or the quality, the only evidence to be had being that of an interested party. Old lays are such as have remained in grass over one year, and which by custom the tenant might have ploughed and cropped with wheat. A year's rent of such lays is the usual allowance if the land is in fair condition, or less, according to its condition. The al-

lowance for underwood is for the value of the growth to the stem, and where the fences are very wide this is a considerable item. In the hop districts underwood land, properly managed, yields large returns for hop-poles—in many cases larger than the land under cultivation. The incoming tenant, in paying for the different articles of this "inventory," must, on an extensive farm, sink a large amount of capital—probably, on an average not much under £2 an acre, and on hop farms considerably more. The effect of this has been to limit the competition for farms, and to produce a moderate rate of rental; while it also enables the tenant, if necessary, to borrow money, which is readily lent to him on the security of his "valuations," and these, in fact, very frequently are mortgaged. But with such advantages the system has serious drawbacks also. It obliges an incoming tenant to sink at the commencement a large portion of his capital, and in that way cripples him of much that would be required in carrying on the cultivation of his farm. It encourages trickery and deceit; a man who has been taken advantage of at his entry, thinking himself quite justified in retaliating on his successor. Indeed, some men are such adepts at this, that they find it profitable to change from farm to farm, their profit arising from the difference they receive when they go out above what they paid at their entering. The subject is of such importance that we quote two cases in illustration, supplied by Lord Liverpool (on whose authority as an agriculturist, however, we offer no opinion), in a letter published in the *Sussex Advertiser*, on the 15th of January last:—

"Some years ago," writes his lordship, "I had a farm on my lands, in East Sussex, for one or two

years. The quality of the land not being very good, I had some difficulty in procuring a tenant. At length one appeared, but, as his purse was not very full, I allowed the inventory to lie; that is, in other words, he did not pay it. He only remained one year—namely, from Michaelmas to Michaelmas, used the farm extremely ill, but contrived to swell his outgoing inventory by every trick, in which he was an adept; and, upon his leaving the farm, received a difference upon the inventory of above £100. In another case of a tenant leaving upon this estate, the valuers met long after Michaelmas, the wheat seedings had taken place, and the manure having been previously carried out, spread, and ploughed in, no trace or record remained to guide the valuers as to the quantities of manure except what the outgoing tenant and his people chose to tell them. The outgoing tenant was asked the quantities. He said he had put 100 loads of manure to the acre. This was such an astounding untruth, that the valuers looked aghast; but, as the outgoing tenant had quarrelled with his waggoner, the latter showed the valuers a 'chalk' account which had been made of cartloads taken out of the yard, whereby the 100 loads an acre were reduced to 25."

While this system leads, in some cases, to such roguery, we cannot say that it appears to produce good farming, the cultivation of the Weald, where it exists in greatest force, being far inferior to that of West Sussex, where the payments are confined to acts of husbandry, and the value of the hay and straw. We draw no conclusion from this, however, against the principle of payment for unexhausted improvements, though it shows the necessity for cautious legislation on the subject. In Lincolnshire we hope to find matters placed on a just basis between tenant and landlord, which, while acting for their mutual benefit, will promote the general welfare.

G A S - W A T E R .

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I read a few days ago, in our local paper, an extract from the *Agricultural Gazette*, detailing the system pursued by Mr. Rigden on his farm at Hove, near Brighton. Among other manures, I perceive he has used ammoniacal water, commonly called "gas-water," which has for some time been recommended in your columns as worthy the attention of farmers. Living near gas-works, I have often regretted that that article should be allowed to run to waste, when high prices were being paid for other manures probably less valuable, and determined to make an essay as soon as the season permitted. Accordingly, in April last, I selected a piece of pasture, and proceeded to treat it as I shall now describe. Having divided the plot into five

equal parts, containing three square yards each, I applied to No. 1 one gallon of gas-water; to No. 2 half ditto of gas-water and half ditto pure water; to No. 3, a quarter ditto of gas-water and three-quarters ditto pure water; No. 4 I top-dressed with as much earth (road-scrappings) as a gallon of gas-water would moisten; and No. 5 with a similar quantity wetted with half-a-gallon of gas-water, and half ditto pure water. Having got so far, I began to feel anxious for the result, which showed itself, in fact, much sooner than I had expected; for, a few minutes after the gas-water had been poured on No. 1, it became, all but the interior of the plant, entirely withered, as if scalding water had been thrown upon it. No. 2, being only half-

dosed, was consequently only half as bad. No. 3 seemed to be in no way changed either then or since. Nos. 4 and 5 were longer in showing the effect; but, after ten days or so, No. 5 began to be covered with a fine healthy sward, nearly hiding the top-dressing, "and was eagerly eaten by the cattle, showing there was nothing distasteful in it;" and No. 4, though somewhat later, came on equally well, and, if anything, retained its verdure longer. Six months have now elapsed, and the two latter are easily distinguished from the others, which have not yet recovered from their severe drenching.

By this experiment, trifling as it may appear, it so far proves that gas-water in its pure state is inimical to vegetation; but if laid on as in No. 5—

half-and-half—it becomes a cheap and rapid fertilizer.

As to Mr. Rigden's objection to it on the score of its producing weeds, it is well known that they luxuriate in rich soil; and, with all due deference to the opinion of that gentleman as an experienced and extensive agriculturist, I would beg to say that if the land were thoroughly cleaned, neither ammoniacal water nor any other manure would engender weeds, and I would not on that account discard it without a further trial.

Apologizing for trespassing on you at such a length,

I am, Sir, yours obediently,

Whitehaven, Nov. 14.

E. G. S.

AGRICULTURAL PHYSIOLOGY—ANIMAL AND VEGETABLE.

It is only within a very recent period that the wonderful influences of vitality have been properly appreciated or at all investigated—at least in their relation to agricultural productions. We may burn a plant, and obtain a pretty accurate approximation to a discovery of its constituent parts, mineral and gaseous; but how they are obtained, eliminated, held together, and assimilated, is another branch of study; and the mere chemist who confines his investigations to the simple changes of dead matter, will find so many opposing influences where *life* is concerned, that he must either give up the pursuit in despair, or begin to study and register and experiment upon organic agency.

As regards the growth of plants and the development of animals, in both of which the agriculturist is practically interested, a little begins to be known. The process of discovery, at all times difficult and tedious, is much more so when organization interferes. The great outlines of *how* plants and animals are fed, are not less important than the question of what they are fed on; and both must be known, before anything but hap-hazard practice may venture to hit upon the right principle, more owing to "good luck than good management."

With all his mistakes Liebig may doubtless be considered the father of agricultural physiology; but his books cannot be taken so completely for granted as might be wished. Subsequent experiments—set to work, no doubt, by his hypotheses—have, to a considerable extent, modified several of his theories; but as a valuable whole, as a suggestive effort, it is impossible to deny that Liebig laid the foundation-stone of agricultural physiology as a science.

Finding carbon, oxygen, hydrogen, and azote, to be the main bulk of the entire race of plants the

farmer cultivates, and detecting these in sufficient quantity, as he believed, for their wants in the air and in water, Liebig came too hastily to the conclusion that mineral manures were all that the plants needed; and the experiments with soluble phosphates on some very barren soils seemed to indicate that he was right; but no sooner were his patent manures fairly introduced into this country than their failure was too palpable to escape immediate detection. And yet he was right. There were soils doubtless where they would have been useful—soils very full of carbonaceous and ammoniacal compounds, but deficient in mineral matter; while of course on soils *vice versa* they would have no beneficial effect whatever.

Hence we say Liebig requires to be read with that reservation and caution which subsequent discoveries have rendered necessary, and we hail with satisfaction the valuable work of Dr. T. Lindley Kemp,* "Agricultural Physiology," as affording a ready means of finding at one view all that is known at the present day of that science.

In his introduction the writer says, in answer to the inquiry, "Which science is it that influences the art of agriculture?" "Many people think that it is chemistry. Chemistry, indeed, is as essential to the study of all mixed physical science as an alphabet is to that of language. It teaches us the nature and properties of the various elementary constituents of bodies, and the laws which regulate their combination in the inorganic or non-vital world. The agriculturist, however, is engaged with organic or vital beings—plants and animals.

* "Agricultural Physiology, Animal and Vegetable: designed for the Use of Practical Agriculturists." By T. Lindley Kemp, M.D. London & Edinburgh: Blackwood & Sons. Pp. 244.

The combinations and other processes which take place in such are not in subjection to the laws of chemistry (only), but of another and separate science—that of physiology.”

Scattered through the work are several highly valuable practical hints, as well as scientific disquisitions. We need only mention the following, on mineral manures, in illustration of the remarks we made on Liebig's patented mineral manures:—

“A great deal of disappointment has often followed the application of these manures. This, however, is to be attributed to the improper manner in which they are applied. A man, for instance, has a field which yields an indifferent crop of wheat. We shall assume that the reason of this is, that his field is deficient in magnesia. By some lucky chance he applies Epsom salts, and he is rewarded with a most abundant crop. His neighbour likewise has a field which gives a bad yield of wheat; but in this case the reason is, that he has exhausted his soil of phosphorus. However, as he has seen a large crop of wheat after Epsom salts, he applies them to his field. Of course his crop is not a whit better than it was before; and, instead of blaming his own ignorance, he blames scientific agriculture. He ought, of course, to find out that substance or those substances in which his soil is deficient, and apply them” (p. 124).

Those parts of his work referring to animal physiology are not less interesting nor less instructive

than that which refers to vegetation. On this, however, it must be admitted still less is known. We know a few results: we know little of influencing and modifying causes. His observations on animal heat, for instance, show this most completely. After showing that a dead animal or plant will soon become of exactly the same temperature as the adjoining air, and the same animal or plant during life had a temperature, such as man, 100 degrees; some birds as high as 112 degrees; reptiles 86 degrees; while fishes are as low as 2 or 3 degrees higher than the water in which they swim, as plants are some 1 to 1½ higher than the atmosphere in which they live; he then goes on to show that while the additional heat is due partly and mainly to the formation of carbonic-acid gas, still he asserts that “the quantity of carbonic-acid gas given out from the lungs of an animal during a certain period be ascertained, and if the heat evolved by it during the same period be likewise ascertained, it is found that the quantity of carbonic acid thrown off by it is sufficient to account, not for the whole, but for three-fourths only of the caloric.” Might he not have added that the hydrogen burnt at the pores of the skin would account for the rest? He merely, however, alludes to chemical changes taking place in the blood in the course of its circulation, as being probably the cause. And it may be there are other changes, after all, than the burning of carbon and hydrogen.—Gardeners' and Farmers' Journal.

SALE OF SHORT-HORNS AT AYNHOE.

The herd of pure bred Short-Horned Cattle, Alderney Cows, and Pigs, of choice breeds, at the Aynhoe Farm, the property of the late Sir Thomas Cartwright, were on the 5th Nov. submitted to public competition by Mr. Jonas Paxton, the well known auctioneer of Bicester. From its first announcement, the sale created considerable interest in the locality. At 1 o'clock, nearly 300 of the leading agriculturists of the district, and a large number of gentlemen from a distance, sat down to a substantial repast, provided for the occasion in the spacious granary, at the Aynhoe Warren Farm. The building was decorated with laurels, evergreens, &c., and presented an animated and pleasing appearance. The wines were not only excellent, but also abundant. The repast being over, Mr. Paxton proceeded to bring the merits of the important and valuable stock before his numerous auditory. At 2 o'clock business commenced. For most of the lots a spirited competition was carried on, and we hear that the prices obtained were perfectly satisfactory to the proprietor. It was amusing to observe the astonishment depicted in the countenances of many of the neighbouring farmers, at the prices realized. They evidently had no idea that “breed” had so much to do with value. This was particularly observable on the disposal of a calf, 12 days old. In a country market it would have made about 30s.; whereas, in consequence of its high pedigree, it was disposed of for 25 guineas. Amongst the company, we observed Sir

Charles Knightley, Bart., Col. Bowles, Hon. P. Barrington, W. H. Dashwood, H. Hall, T. Cartwright, T. T. Drake, jun., H. Peyton, B. W. Colvin, W. W. and C. Willis, H. Buckwell, W. H. Hitchcock, S. Field, W. C., V., and E. Turner, and W. Law, Esqrs., and about 500 of the principal agriculturists and stock breeders of the neighbourhood. The following are the prices obtained, and the names of the purchasers.

COWS AND HEIFERS.

TUTSAN, red, calved Jan. 9, 1842, bred by Earl Spencer—£24 3s.; Mr. Greig, Northamptonshire.
FEATHERS, roan, calved March 22, 1844, bred by Earl Spencer (b. by Upstart, March 24)—£63; C. Towneley, Esq., Towneley Park, Lancashire.
TRANQUIL, roan, calved May 20, 1844 (b. by Upstart, March 10)—£18 7s. 6d.; W. W. Willes, Esq., Astrop.
TELLURIA, red and white, calved August 16, 1844, bred by Earl Spencer (b. by Upstart, Jan. 16)—£110 5s.; C. Towneley, Esq.
DAISY, roan, calved Dec. 11, 1844, bred by the Earl of Sherbourne (b. by Upstart, April 14)—£39 18s.; Mr. Turner, Harrington.
METAL, red and white, calved March 12, 1846, bred by Earl Spencer (b. by Sugarplum, May 16)—£49 7s.; W. Smith, Esq., West Rasen, near Market Rasen.

DAHLIA, red and white, calved March 6, 1850—£22 1s.; H. Ambler, Esq., Walker Hall.
PRINCESS ELLEN, red and white, calved March 11, 1850—£17 17s.; B. W. Colvin, Esq.
JENNY LIND, roan, calved March 28, 1850—£18 17s. 6d.; Mr. Middleton, Cutslow, Oxford.
COWSLIP, white, calved May 29, 1850—£22 1s.; B. W. Colvin, Esq.

UPSTART, roan, calved May 8, 1847—£86 2s.; — Jamieson,
Esq.
SUGARPLUM, red, calved Feb. 8, 1848—£37 16s.; Mr. R.
Dudding.
TARQUIN, red and white, calved Nov. 2, 1849—£31 10s.;
Mr. Turner.
ROMULUS, red, calved Oct. 3, 1850—£8 8s.; Mr. Simpkins.
NICKEL, red, calved Oct. 24, 1850—£26 5s.; C. Towneley,
Esq.

A pure-bred in-calf Alderney Cow	£11	0	0	Mr. Lane.
ditto ditto	15	5	0	H. Ambler, Esq.
ditto ditto	8	0	0	M. Fessey.
ditto ditto	9	10	0	H. Strafford, Esq.
ditto Heifer	8	0	0	Mr. J. Bartlett.
A Cow Calf, half Alderney	6	10	0	Mr. Horwood.
ditto ditto	2	10	0	Mr. Butler.
A Bull Calf	1	12	6	Mr. W. Whichello.

An in-pig sow	£3	5	0...	Mr. Drinkwater.
ditto	3	10	0...	Mr. Baker.
ditto	3	0	0...	Mr. Bliss.
ditto	4	0	0...	Mr. Strafford.
ditto	4	5	0...	Mr. Baker.
ditto	5	15	0...	Mr. Creig.
ditto	4	0	0...	Mr. Strafford.
ditto	7	0	0...	T.T.Drake,jun.,Esq.
A Gelf	3	0	0...	Mr. Johuson.
ditto	5	5	0...	Mr. Strafford.
ditto	3	15	0...	A. Hayward, Esq.
ditto	6	0	0...	Mr. Strafford.
ditto	4	0	0...	Mr. Drinkwater.
A Boar	7	0	0...	Mr. Strafford.
ditto	4	15	0...	Mr. Willifer.
ditto	3	10	0...	Mr. Horwood.
ditto	3	5	0...	Mr. Baker.
ditto	3	15	0...	Mr. Creig.

The mean temperature of the three months ending August, constituting the three summer months, was 61°·1, being 1°·2 above the average of 79 preceding summers.

Thunder storms occurred on July 2nd at Liverpool; on the 4th at Wakefield and Nottingham; on the 9th at Uckfield; on the 15th at Oxford, Aylesbury, Hartwell House, Hartwell Rectory, Stone, Holkham, Norwich, and Oxford; on the 16th at Holkham, Hawarden, Liverpool, Manchester, Norwich, Nottingham, and Stonyhurst; on the 17th at Greenwich, Uckfield, Aylesbury, Hartwell House, Stone, Linslade, Cardington, Leicester, Greenwich, Hartwell Rectory, Nottingham, and at Dunino there was a distant storm to the S.W.; on the 18th at Helston, Exeter, Greenwich, St. John's Wood, Oxford, Aylesbury, Hartwell House and Rectory, Stone, Linslade, Cardington, Leicester, Durham, and Nottingham; on the 23rd at Jersey and Hawarden; and on the 28th at Guernsey and Helston. On August 3rd at Rose-hill, Oxford; on the 5th at Holkham; on the 6th at Stone and Dunino; on the 7th at Hartwell House; on the 8th at Oxford, Hartwell House, Stone, Linslade, Cardington, Hawarden, Liverpool, York, and North Shields; on the 9th at York and Hartwell Rectory; on the 12th at Greenwich, Norwich, and Oxford; on the 13th and 15th at St. John's Wood; the 19th at Liverpool; on the 20th at Holkham and Nottingham; on the 21st at Nottingham; on the 24th at Greenwich and Hartwell House; on the 27th at Guernsey; on the 29th at Guernsey and Helston, and on the 30th at Guernsey. On Sept. 20th at Exeter; on the 23rd at Holkham and Norwich; on the 24th at Holkham; on the 26th at Stonyhurst, and on the 30th at Jersey and Trowbridge.

At Exeter.—On the 25th of July, the reading of the barometer decreased from 29.510 at 9 a.m. to 29.237 at 9 p.m., and the wind blew strong from the S.W., and a thunder storm then set in, accompanied by very heavy rain.

At Huckfield.—During the third week of July, the weather was very wet, and many places in Sussex were visited by severe thunder storms.

At Hartwell Rectory.—On the 15th of July, at 1 h. 30 m. p.m., there was a storm, with thunder and lightning and very heavy rain, measuring in the gauge 0.510 in. The weather continued stormy, with sheet lightning, all the evening. July 17th, at 6 h. 30 m. p.m., there was another thunder storm, but very little rain; sheet lightning was seen at intervals during the evening, to the south and west. July 18th, at 3 h. 30 m. p.m., there was a thunder storm and heavy rain; there was sheet lightning also in the evening, followed by continued rain, which measured in gauge, on the following morning, 1.16 in.

At York.—On August 8th, a thunder storm occurred between 6 and 8 in the evening. The Diocesan school and the Roman Catholic chapel were

struck by lightning and injured; sheep were killed, and two individuals were knocked down, but no human life was lost. This was the severest storm that has occurred in York for the last 20 years. Thunder and lightning occurred again on the 9th.

At Stonyhurst.—The lightning during the thunder storm of 16th July was the most brilliant Mr. Weld remembers ever to have witnessed. It frequently resembled the explosion of fireworks, and on several occasions three or four branches darted from the same centre: while sometimes the sky seemed traversed in every direction by streaming lightning of the most vivid description. The thunder was incessant, but very distant, and no rain fell. Mr. Weld heard of seven persons being killed, and about as many more struck, but not killed, besides several valuable cows and horses which were killed.

Thunder was heard, but lightning was not seen, on July 4th, at North Shields; on the 9th at Holkham; on the 15th at Guernsey; on the 16th at St. John's Wood, Linslade, Stone, and Wakefield; on the 17th at Greenwich, Durham, and North Shields; on the 18th at Wakefield; on the 19th at Stone; and on the 23rd at Guernsey. On August 6th at Oxford, Aylesbury, Holkham, and North Shields; on the 12th at Uckfield, Linslade, Holkham, Hawarden, and Liverpool; on the 13th at Jersey; on the 19th at Norwich; on the 21st at Dunino; on the 23rd at Cardington; on the 24th at Exeter, Oxford, Hartwell Rectory, and at Stone; and on the 28th at Nottingham. On September 3rd and 24th at Aylesbury, and on the 26th at Durham and North Shields, and on the 27th at St. John's Wood.

Lightning was seen, but thunder not heard, on July 8th, at Uckfield; on the 15th at Uckfield, Hartwell Rectory, Stone, Linslade, Cardington, Leicester, Nottingham, Liverpool, and Stonyhurst; on the 16th at Leicester, Nottingham, and Manchester; on the 17th at St. John's Wood, Oxford, Hartwell Rectory, and Liverpool; on the 19th at Stone; and on the 29th at Manchester. On August 5th at Cardington and Stone; on the 6th at Highfield House; on the 8th at Stonyhurst; on the 9th at Cardington; on the 16th at North Shields; on the 22nd at Norwich and North Shields; on September 23rd at Uckfield, Greenwich, Linslade, and Cardington; on the 24th at Greenwich, Oxford, and Stone; on the 29th at Hartwell Rectory; and on the 30th at Helston, Uckfield, Greenwich, St. John's Wood, Oxford, Hartwell Rectory, and Linslade.

Auroræ Boreales were seen on July the 5th at Nottingham; on July the 12th; at Norwich; on August 6th at Stone; on the 21st at Stone and Dunino; on September 6th and 10th at Notting-

ham; on the 13th at Nottingham and Hawarden; on the 14th at Stone; and on the 28th at Hartwell House, Hartwell Rectory, and Stone.

Hail fell on July 12th at Hawarden; on the 20th at Oxford and Liverpool; and at Dunino on the 21st and 22nd. On September 29th at Guernsey, and on the 30th at Jersey.

Snow fell on Ben Lomond on August 23rd.

Frost.—The first frost was on August 22nd at Uckfield; the wheat and barley sheaves were frozen into a stiff mass, and Mr. Prince saw ice as thick as a wafer on his cucumber frames. On September 5th there was a sharp frost at Hartwell House, and at Trowbridge on September 7th and 8th.

Solar Halos were seen on July 6th at Huckfield; on the 10th near Oxford and Nottingham; on August 3rd at Dunino; on the 17th at Greenwich; on the 20th at Dunino; on the 28th at Uckfield;

on the 29th at Exeter and Nottingham; on September 12th at Guernsey; and on the 29th at Dunino.

Lunar Halos were seen on July 22nd at Stone, Nottingham, and Norwich. On August 21st at Uckfield and Nottingham; on the 22nd at Uckfield, Oxford, Cardington, and Nottingham; on the 23rd at Uckfield and Nottingham; on the 24th at Hawarden; on the 26th at Stonyhurst; and on the 31st at Durham. On September 18th at Jersey, Guernsey, Oxford, and Hawarden; on the 21st at Oxford, Hartwell Rectory, Cardington, Stone, and Durham; on the 22nd at Oxford, Hartwell Rectory, Cardington, Norwich, and Stone; on the 24th at Oxford; on the 25th at Cardington; and on the 26th at Durham.

Lunar Coronæ at Hartwell Rectory on August 14th and 16th.

CALENDAR OF HORTICULTURE.—DECEMBER.

RETROSPECTIVE.—On the 21st of October, the date of the last calendar, the temperature became low, and in some places the dahlias and marvel of Peru were cut off. The average of the ten nights my diary notes 41 deg.; the lowest, on the 29th, 24 deg.; the mean register of the first half of November, nearly 46 deg. by night. There was a fall below freezing on the night of the 14th, followed by cold rime in the morning. This completed the destruction of the dahlias, and of a few other exotics; but here ends the catalogue of the disasters, furnishing a small exception to the wonderfully fine weather of this autumn. The chrysanthemums remain beautiful objects, and constitute the floral ornament of the season. After the frost had given way to the south-west breezes of the 16th, rain began to approach, and we may expect that winter will be close at hand. As it is, the final retrospect is postponed for a few days.

VEGETABLE DEPARTMENT.

Sowing any kind of seeds in the open ground ought to be considered as waste of labour. Unless we adopt the practice recommended by some, to sow peas and beans, salading, lettuce, and radish under glasses or in frames, no good result can be anticipated in ordinary seasons; for if the ground be not locked up by frost, it will, in all probability, be so wet and cloddy as to prohibit the use of any tool whatever. There are, to be sure, occasional dry and mild exceptions, as also in the case of very loose and sandy soils, where to move the ground may not be permanently injurious; but the inexperienced reader may be assured that whenever a

loamy soil, or one that is naturally binding, to move and plant it implicate the texture and the yield of any crop whatsoever. Always premising an open condition of the surface, peas and beans already growing are to be earthed up, after having broken the earth finely as possible. It should then be carefully drawn towards the stems with a broad hoe or rake, observing that the plants also be *dry* at the time of earthing. It will also be wise to protect peas by short sticks (the spray of spruce fir is excellent); these tend to ward off hoar-frost.

Celery and cardoons must be finally ridged, if that be still undone: the finest ridges of the former ought to be guarded from rain as well as frost. Light boards, fastened together at a fitting angle, may be found the best temporary defence.

Endive plants should be treated in succession, as before stated.

Winter spinach, and its broad-leaved Flemish variety, can still be used for the table, and also prudently thinned out, if the weather continue mild; but it is liable to suffer from grubs, and alternate frosts and thaw, in which case entire plants die off.

Mushrooms: Out-of-door beds are so objectionable, that we would always substitute the mushroom house, or a spent melon frame.

Asparagus and sea-kale forcing must be attended to, according to the rules laid down in former calendars. Masses of leaves produce the best and safest beds in pits for the former; and the dark erection, like that used for the mushroom, might with advantage be employed to excite kale and early rhubarb.

Trenching and Double Digging.—These opera-

tions are always alluded to in calendars of the season. If they have so far been neglected, and the weather prove favourable, every plot of stiff soil will be benefited by thus being exposed to any frosts that may supervene. But another cause must now be kept in sight; for, as I have endeavoured to prove, we begin to understand the way in which loamy soils and manures act reciprocally on each other. On this subject, and the preparation of compost, the reader is referred to the article on Cultural Economy.

HARDY FRUIT DEPARTMENT.

Pruning.—Whatever writers may say of this operation, I have made it a point to object to it at that dead season of the year when the juices of the trees are not in any approach to activity, ready to heal the wounds inflicted by the knife. In large gardens, where wall trees are numerous, and skilful pruners few, time may require November and December regulation; but in ordinary cases I would never prune any fruit trees until the swelling of the buds indicates an advance of the sap, unless indeed I except the close cutting back of the shoots of espaliers, foreshortened in August, to assist in the development of spurs; but that close spurring ought to have been completed by the end of the first week of November.

Currant and gooseberry-bushes should be left untouched till the end of January, were it only for the simple reason that small birds, as the tom-tit, are apt to make free with the fruit buds; and the more these are cut away before winter, the fewer remain to produce fruit in the spring.

Raspberries: Having selected to 4 to 6 or 7 rods, worthy of being retained as bearers, cutting and shortening should be postponed till February, upon the same principle that we refrain from pruning rose-bushes so long as a hard frost may be expected to kill the young buds below the wounds. Raspberries rank among the *Rosaceæ*, and their young wood is full of pith.

FORCING DEPARTMENTS.

Early Vinery.—It is possible to have two crops in one year, but prudent growers are satisfied with one from each house; that of the earliest, to ripen its fruit in May, is the one which now claims attention. The house being thoroughly cleaned, and its pipes or fire-flues in good order, the trees carefully washed with soap-water and a brush, subsequently with lime, sulphur-wash if red spider be suspected, the first gentle fire should be kindled about the 10th day, that is, at the precise period when the sun makes its lowest dip in the southwest, and the days cease to shorten in the afternoon. The internal night temperature should not exceed 45 to 48 deg. during the first week, but at its close

an increase of 5 deg. may be allowed, and co-incidentally the sun will set one minute later. At Christmas-day other five degrees may be added to the night temperature, and then the vines may again be moistened with a soft brush or soaked sponge, the hot-water pipes being painted with sulphured cream of lime. Some air by the back openings may be advantageously given when the sun shines, and exalts the internal atmosphere 10 or more deg. We are thus arrived at the end of the year, when, however, there is still no increase in the length of the mornings, as the sun does not rise before 8 minutes after 8, A.M. Still, we have not commenced with what may be called "forcing." The process above described is a sort of coaxing the vine into its safe and proper course; but it is astonishing how speedily one that has thus been cautiously trained takes a hint, a fact of which any one may convince himself who can attempt to excite a vine for the first time that had never been introduced to heat. Let it be remembered that at the period of lighting the first fire (three weeks before would have been better) the vine-border should be coated with a foot of dry mulch, over which an oil-skin covering would be of great utility. Cold drenching rains and snow blankets are sorry adjuncts of internal stimulation. N.B.—"West's St. Peter's" grape, described by Mr. Isaac Oldacre in an early volume of "Loudon's Gardener's Magazine," must not be excited before the 1st of April. I mention this now as a caution, intending to give a practical account of this most delicious variety of the vine in the March or April Calendar, 1851.

The Pine-apple.—On several occasions mention has been made of the *fruiting-house* for a *general* spring and *early* summer crop. This was the practice of bye-gone days, and in some instances had its advantages. The finest stocky plants, nearly all of one age and growth, were taken in the autumn to one house, to be dried off, and thus checked, no fire being lighted till December. The practice implies wealth and numerous appliances, of which I had opportunities during a course of years to witness the results at the magnificent domain of the late Sir George Warrender, at Clifden. The routine need not be again detailed; but the reader should be apprized that the first forcing fire ought to be lighted about the shortest day; soon after which each pot is to be watered to saturation, and subsequently with manure water. Growth and development of fruit then become simultaneous phenomena. The mention of manure-water suggests the following observations: Mr. Oldacre, above named, once said to me—"The growth of the pine is imperfectly understood; we do not know, even now, what quantity of manure it requires, or

whether it requires any at all." Certain it is that the pine-sucker will strike root early and freely into common sandy heath-mould; and the Meudon method of growing the plants seems to imply the continued use of some such earth. If so, manure-water, according to the recent discoveries of absorption, can avail little to any plant growing in heath or, the so-called, bog-earth. If, on the other hand, loamy and strong soils be essentials, then a liberal occasional supply of rich (not muddy) liquid will yield to the loam all its humous and nitrogenous elements to saturation. (See former notices.) Thus we find ample reason and encouragement to persist in a course of investigation.

will demand attention; but we would defer planting, &c., till the turn of the year.

Concluding Remarks.—Rain did in reality set in on the 18th, and much has fallen, the 20th being very wet. The high wind, also, has seriously battered the tall chrysanthemums. A great fall in the barometer, exhibited in the diary, will indicate much wet, which may restore the balance hitherto unattained. At present everything is fine, cheap, and in sufficient abundance; unless, perhaps, we may except apples, which our dealers say will be scarce and dear before Christmas. Potatoes no one talks about; the quality improves, and the wholesale prices quoted scarcely average, if we mistake not, the half of those asked in 1848.

Sweeping the walks, &c., of pleasure-grounds

Nov. 20th.

JOHN TOWERS.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
Oct. 22	30.09	29.88	36	50	40	Northerly	gentle	fine	sun	cloudy	dry
23	29.34	29.18	38	46	41	S. W., N. W.	brisk	fine	cloudy	cloudy	rain
24	29.81	29.31	38	41	39	Easterly	gentle	cloudy	cloudy	cloudy	rain
25	29.33	29.50	37	44	41	E. by North	gentle	cloudy	cloudy	fine	rain
26	29.60	29.80	37	46	40	E. by North	gentle	cloudy	cloudy	fine	dry
27	29.90	29.76	35	48	42	S. West	gentle	cloudy	cloudy	fine	dry
28	29.44	29.32	42	50	42	W. by South	gentle	fine	sun	cloudy	rain
29	29.48	29.66	34	47	40	W. N. W.	gentle	fine	sun	fine	dry
30	29.70	29.70	34	49	49	S. West	lively	cloudy	cloudy	cloudy	rain
31	29.75	29.96	42	53	47	W. by North	gentle	cloudy	sun	cloudy	dry
Nov. 1	29.98	30.00	42	55	52	W. by South	lively	cloudy	fine	cloudy	rain
2	30.00	30.01	52	58	53	W. by South	lively	cloudy	cloudy	cloudy	dry
3	30.18	30.05	46	56	49	W. by South	gentle	fine	sun	fine	dry
4	29.86	30.05	46	56	46	W. by South	vry. bk.	cloudy	cloudy	fine	rain
5	30.04	29.99	41	54	50	W. by South	vry. bk.	cloudy	fine	fine	dry
6	30.05	30.12	45	54	47	Westerly	lively	fine	sun	fine	dry
7	30.13	29.98	45	55	50	S. Westerly	brisk	cloudy	cloudy	cloudy	dry
8	29.93	30.18	47	54	45	W. by North	variab.	cloudy	sun	fine	rain
9	30.30	30.30	45	52	52	Westerly	gentle	fine	cloudy	cloudy	dry
10	30.31	30.22	45	55	52	S. West	lively	fine	cloudy	cloudy	dry
11	30.14	30.02	47	56	51	W. N. W.	gentle	fine	sun	fine	dry
12	30.02	30.02	49	56	46	W. N. W.	gentle	cloudy	sun	fine	rain
13	30.02	29.99	37	45	43	Westerly	gentle	fine	sun	fine	dry
14	30.14	30.26	34	44	32	Var., N. by E.	calm	fine	sun	fine	dry
15	30.28	30.20	28	42	41	W. by South	gentle	fine	cloudy	fine	dry
16	30.10	30.00	37	51	47	S. West	gentle	cloudy	cloudy	cloudy	rain
17	30.06	30.06	37	54	42	Westerly	gentle	fine	sun	cloudy	dry
18	29.90	29.55	42	47	47	S. Westerly	lively	cloudy	cloudy	cloudy	rain
19	29.15	28.85	45	54	46	S. West	strong	cloudy	fine	fine	rain
20	28.74	28.99	45	47	46	Westerly	gentle	cloudy	cloudy	cloudy	rain

ESTIMATED AVERAGES OF NOVEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.27	29.08	62	23	42.9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
50.06	41.	45.53

WEATHER AND PHENOMENA.

October 22—Cloudy evening. 23—Profuse rain. 24—Rain most of the day. 25—Overcast; little rain. 26—Damp. 27—Fine cold day; rime early; many clustered spots on the sun. 28—Some sun. 29—Early hoar frost; fine. 30—Overcast; a little rain. 31—Month closes finely.

LUNATION.—Last quarter, 28th day, 4h. 59m. morning.

November 1—Pretty fine; sun warm. 2—Overcast. 3—Sunny till 3 P.M. 4—Showers. 5—Much wind. 6—Fine; some clouds. 7—Small rain. 8, 9—Fine. 10—Changeable. 11—Superb. 12—Brisk shower, then fine. 13—Hazy, with rime. 14—Cold haze at night. 15—Keen frost; change of wind. 16—Becomes unsettled. 17—Very fine; evening changeable. 18—Overcast; much rain. 19—High driving wind; masses of

clouds; gleams. 20—Small rain; very wet afternoon.

LUNATIONS.—New moon, 4th day, 2h. 40m. morning. First quarter, 11th day, 11h. 15m. night. Full moon, 19th day, 4h. 35m., afternoon.

REMARKS REFERRING TO AGRICULTURE.—An extraordinary fine and dry season till the middle of the month of November, when a wet change commenced. The autumn has been favourable to sowing of wheat, which now has become later, farmers believing that they thus avoid winter luxuriance of plant. The rains must fall in great abundance during the five remaining weeks to make up the yearly average. The springs and wells are low, and the ground must still be deeply dry—in Surrey at all events.

J. TOWERS.

Croydon.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT
FOR NOVEMBER.

This has been rather a busy month for the agriculturists, especially for those residing in the north. From quite its commencement, until about the 15th, both ploughing and sowing progressed rapidly; but since that date, owing to the immense quantities of rain which have fallen in most parts of England, and which have, in some instances, flooded the low lands, very little has been done in the fields; nevertheless, most out-door labours are seasonably forward, and no unfavourable result is anticipated from superabundant moisture. In the southern, western, and midland counties the young wheats are looking remarkably well, without any appearance of becoming proud. The quantity of wheat thrashed out since we last wrote has been small, as many of the growers appear to be under the impression that prices will shortly advance. How far their anticipations are justified time will show, but we entertain very great doubts whether any permanent improvement can take place in the quotations whilst we are submitted to such a stern foreign competition as that forced upon us by the new tariff. The produce of the crops in France during the last two years must have been immense, when the continuous imports of flour into the United Kingdom are taken into consideration; and the most startling fact is still apparent that, notwithstanding the extent of the shipments, prices are still falling in most of the French departments, even though the importations of wheat from the Black Sea and other quarters of the globe have been on a very limited scale for some time past. The quality

of the flour produced in France being well suited for consumption in this country, it has become a "favourite" amongst most of the bakers, especially as it consumes a large quantity of moisture. It follows, therefore, that so long as a good ready money market can be found here, so long shall we have to report arrivals, and depressed currencies of the article manufactured in this country. Our correspondents in the midland counties loudly complain of the yield of the present year's growth of wheat, as well as most kinds of spring corn. One of them, residing in Northamptonshire, observes—"Many crops, before harvest, looked quite capable of producing five quarters per acre; but how greatly have we been disappointed! as they have only produced three quarters per acre, and we have a great many not more than six bags or eighteen bushels. I have thrashed the produce of five acres, which yielded eight quarters four bushels of best, and two quarters six bushels of tail; this, together, makes 90 bushels off five acres. I offered the eight quarters four bushels to several millers at 4s. per bushel, but could not find a buyer. Wheat has been thrashed out freely, and the best qualities have come first, for it is useless to take an article to market we cannot sell, and many who are not needy men have thrashed a great deal, which they would not have done had they considered the extreme quantity required to make up the deficiency of this year's growth." To an extent, the above remarks might be applied to Lincolnshire, Cambridgeshire, &c.; though we can scarcely concur in the opinion that the same deficiency occurs all over England. The supply of really fine malting barley

is turning out small, and it is evident that the produce of the entire crop of that grain is much smaller than was anticipated some time since.

The whole of the potatoes having been raised and pitted, a fair estimate of their growth has now been fairly arrived at. That the losses by disease have been small this season cannot be doubted. Prices, in the absence of any supplies worthy of notice from the continent, which have not exceeded 400 tons during the month, have slightly advanced, 90s. having been realized for Yorkshire Regents. As regards quality and general condition, we may observe that they never looked finer; and from present appearances it is pretty evident that large supplies will reach us, not only from our own coasts, but likewise from Scotland, during the winter months. The produce in France Holland, and Belgium is stated to be a most excellent one; hence, heavy importations may be looked for between this and the latter end of February.

Although the past has been a favourable period for fat stock, the general quality of the beasts as yet received in the metropolis from the north of England has been inferior, but the sheep have mostly come to hand in good condition. No serious complaints have reached us on the subject of the disease so long prevalent amongst cattle, and it is hoped that its virulence has greatly subsided. The continuance of warlike operations in Schleswig Holstein has induced large shipments of beasts from Jutland, and it will be perceived that the importations have continued unusually extensive. The comparative abundance of pasture and dry food, and the unwillingness on the part of the graziers to speculate extensively, have kept the prices of linseed and rape-cake unusually low; indeed, so little has been doing in the article that prices have ruled almost nominal.

The transactions in hops have fallen off, since the official declaration of the duty, and most inferior qualities have materially receded in value. The supplies in London are now unusually large. Old hops have sold with difficulty, at miserably low prices. The general produce markets have continued tolerably steady; but the quotations of both hay and straw, arising from the extensive receipts in the metropolis, have given way to some extent. Meadow hay has sold at from £2 8s. to £3 16s.; clover ditto, £3 to £4 4s.; and straw, £1 1s. to £1 8s. per load.

The turnip and beet crops are not proving very fine as to quality, although the growth is rather a large one.

The produce of grain, both in Ireland and Scotland, is turning out well. From the former, the shipments of oats—which are mostly in fine condition—have considerably increased; whilst, from

the latter, nearly 5,000 tons of potatoes have been forwarded to London.

The fourth series of colonial wool for the present year are in progress at the Hall of Commerce. The total quantity to be offered thereat is 20,000 bales, 4,600 having been withdrawn, as the brokers are mostly of opinion—arising from it being understood that very moderate importations will take place between this and the beginning of May—that higher rates will yet rule. The advance obtained on this occasion is 1d. on Australian, and $\frac{1}{2}$ d. per lb. on Cape wools. In the private markets, English quantities have been held for the same amount of improvement. The quantities of wool submitted for competition, and disposed of this year, have been as under:—

	Bales.
February sales	18,013
May sales	21,969
June and July sales	49,562
August and September sales	50,150
November sales	20,000
Total	159,694

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

From the statements given below, it will be perceived that the importations of foreign stock of all kinds have been considerably in excess of those at most former corresponding periods of the year; that prices have, as a necessary consequence, ruled low, but that the total supplies exhibited in Smithfield have not increased to any extent. We have long prepared our readers for increased supplies from abroad, though it must be admitted, on the present occasion, that the excess is chiefly to be attributed to the war in Schleswig-Holstein having induced the Jutland graziers to forward more liberally than they otherwise would have done. More than a moiety of the beasts have been Jutlanders in very bad condition, and, judging from the prices obtained for them, we may safely assume that they have lost the importers from £1 to £3 per head. We attribute the falling off in the supplies of home-fed stock to the great disuse of oil-cake, by which, of course, both beasts and sheep are not forced so rapidly for consumption; nevertheless, as that decline has been fully made good by the foreigners, the demand, though tolerably steady, has been well met.

Prices, compared with those ruling in the previous month, may be considered about 2d. per 8lbs. higher, not only for beasts, but likewise sheep, calves, and pigs. Had the weather been colder, no improvement could scarcely have taken place, as the receipts of slaughtered meat would have increased materially. No doubt, large numbers of

beasts have been kept back until the Christmas market, which, we understand, is likely to prove a most excellent one.

The following supplies have been brought forward:—

	Head.
Beasts.....	19,896
Cows	419
Sheep	120,206
Calves.....	1,475
Pigs.....	2,872

COMPARISON OF SUPPLIES.

	Nov. 1846.	Nov. 1847.	Nov. 1848.	Nov. 1849.
Beasts ..	20,361	20,514	19,700	19,388
Cows ..	470	583	600	342
Sheep..	114,460	121,320	103,770	120,060
Calves..	1,186	1,608	1,483	1,113
Pigs....	2,838	3,206	2,326	2,116

In glancing at the above comparative statement, one might be led to conclude that, notwithstanding foreign stock is admitted free of duty, production is not keeping pace with consumption; but our readers must bear in mind that the stock disposed of in Smithfield forms only about half the quantity of meat annually consumed in London. In several parts of the country, especially near the manufacturing districts, hides, skins and offal are worth more money than in the metropolis; the consequence is—and the present rapid mode of transit by railway greatly facilitates the enterprise—that we frequently receive 20,000 carcasses of meat up to Newgate and Leadenhall markets in a single week.

The range of prices has been as under:—

Per 8 lbs. to sink the offals.

	s.	d.	s.	d.
Beef	from 2	6	to 3	10
Mutton	2	8	to 4	2
Veal	2	8	to 3	10
Pork	3	0	to 4	2

COMPARISON OF PRICES.

	Nov., 1847.	Nov., 1848.	Nov., 1849.
	s. d. s. d.	s. d. s. d.	s. d. s. d.
Beef ..	3 2 to 5 0	2 8 to 4 2	2 8 to 4 0
Mutton	3 8 to 5 4	3 0 to 5 0	2 10 to 4 2
Veal ..	3 10 to 5 0	3 4 to 4 4	3 2 to 4 0
Pork ..	4 0 to 5 2	3 10 to 4 8	3 2 to 4 4

The bullock droves from Lincolnshire, Leicestershire, and Northamptonshire have amounted to 11,350 short-horns, being 3,350 more than in November 1849: from other parts of England, only 1,300 Herefords, runts, &c., have come to hand; but 275 have reached us from Scotland, and a few beasts and pigs from Ireland direct by sea.

FOREIGN IMPORTS INTO LONDON.

	Head.
Beasts	5,928
Sheep	17,662
Calves	1,058
Pigs	1,486

COMPARISON OF IMPORTS.

	Nov. 1846.	Nov. 1847.	Nov. 1848.	Nov. 1849.
Beasts ..	2,823	3,486	3,488	4,228
Sheep ..	8,939	16,213	13,424	14,204
Lambs ..	—	121	77	—
Calves ..	124	667	669	618
Pigs	—	41	—	409

At the outports 3,100 head of stock have been landed, mostly from Hambro' and Rotterdam.

Newgate and Leadenhall Markets have been well supplied; but the trade has ruled dull.

ANDOVER SHEEP FAIR, (Monday last.)—The number of sheep exceeded the usual average; but notwithstanding the large supply, an unusually good business was transacted, and sales were made with unusual rapidity. The prices also were deemed very satisfactory. By the middle of the day the whole had been disposed of, and the prices obtained were stated generally to be from 1s. to 2s. per head above those of the late Appleshaw and Winton fairs. At the Town Fair on Tuesday, the supply of cheese was greater than at many of the previous fairs; but, owing to the absence of the London dealers, the purchasers consisted chiefly of the trade in the town and neighbourhood, and business was very dull, a great part remaining unsold. The following were the prices:—White Cheddar, 70s. to 76s.; Somerset, 60s. to 65s.; Wiltshire, 56s. to 60s.; new cheese, 42s. to 48s.; skim, 18s. to 21s.

BARNET FAIR, Nov. 21.—The supply of both fat and lean cattle was very extensive. The barren cows and half-fatted beast were in great request; prices were not high, but there was life in the trade. The store beast consisted of Welsh steers and Irish heifers, the former making £4 to £5 10s. each; the latter, in good condition, £3 to £4; small yearlings, £1 to £1 5s. The demand for present calving cows was good, and sold better in proportion than any other stock. In bulls the trade was bad, not a good bred animal to be seen. In the afternoon there was a tolerable show of horses and ponies, and much business transacted amongst the latter.

DURHAM FAIR.—There was a considerable supply of lean cattle, and no lack of buyers, although the sales effected were still at reduced prices.

EGTON FAIR, Nov. 18.—There was a marked improvement; business was more active, and prices on the rise. Beef was sold at an advance of 6d. per stone, and lean stock about 10s. each.

KNIGHTON FAIR was very thinly attended with stock of any kind, and those which were offered were very soon sold at an advance on former prices. It was allowed to be the best fair in the neighbourhood. Butter sold well at from 9s. 6d. to 10s. per stone; cheese from 4½d. to 6d. per lb. There was exhibited for sale a lot of sixteen two-year-old steers, bred and fed by Mr. Jones, of the Moat, Beguildy. These splendid animals were purchased by Mr. Carwardine, dealer, of Leominster. It is an honour to have such cattle bred in the principality; and we may truly boast of our beautiful little fertile valley of Teme. One pair of these steers has since been sold to his Royal Highness Prince Albert. The honour will doubtless have its proper effect in stirring up our Radnorshire farmers to improve their breed of stock.

MODBURY FAIR.—Above 2,000 sheep were penned, and 1,700 of them were sold. It is the largest sheep fair held in the south of Devon. The supply of bullocks and horses was not large, but a quantity of the former were sold. Fat bullocks brought from 40s. to 44s., store bullocks 30s. to 33s. per cwt.; cows and calves £9 to £12 each; fat ewes 4½d. to 4½d., prime wethers 5d. per lb.; breeding ewes 20s. to 28s. each.

A correspondent inquires of Mr. Charnock, "At what season is the rapecake to be harrowed in for the destruction of the wire-worm—whether at sowing time or in the spring?"

REVIEW OF THE CORN TRADE DURING THE MONTH OF NOVEMBER.

The season thus far has been remarkably mild and open, and such field-works as were not previously completed have been finished since our last in as auspicious a manner as could be desired. The favourable character of the autumn has probably had the effect of inducing farmers to sow wheat more extensively than would have been the case if the season had proved less propitious; and we are inclined to think that, notwithstanding the low range of prices, and the certainty that few derived any profit from the last crop, the breadth of land under wheat is as large as in previous years. The rain which has lately fallen, and the generally high range of temperature, have caused the grain to germinate quickly; and the young plant now covers the ground, wearing a strong and luxuriant appearance. Indeed, a check to its growth would prove useful, and prevent its becoming too forward.

The great disadvantages under which our agriculturists are labouring, the heavy pecuniary losses which they have been made to suffer in consequence of undue and unfair foreign competition, have hitherto failed to crush their energies; and though they have little hope of realizing a profit by their labour, still they continue to strive on. Notwithstanding the ruinously-low prices caused by free trade, and the fact that wheat has been selling below the cost of production, the land has been carefully prepared, and the seed well got into the ground: almost the whole loss of the free-trade experiment, thus far has fallen on the tenant-farmer. That this state of things cannot endure, is evident. Men will not continue an occupation which yields no profit, and our agriculturists must be put on a fair footing to compete with the foreigner, or land must inevitably go out of cultivation. The landowners have hitherto been but little touched by the new order of things; but their turn must come.

The present average price of wheat for the United Kingdom is about 40s. per qr.; and though there is some appearance of a slight rise occurring, the notion of any permanent or important advance, whilst we admit the surplus produce of countries who can afford to produce wheat at rates which allow large exports to Great Britain (leaving a good return to the growers, if they can calculate on obtaining 40s. per qr. in our markets), is, in our opinion, untenable. During the year 1849, the average price of wheat in this country was 44s. 6d. per qr.; and though the last crop is on all sides allowed to have

fallen short of an usual average, overwhelming foreign supplies have beaten down prices to a still lower level. Two years' experience of free trade proves, therefore, that from 40s. to 45s. per qr. is likely to be about the value of wheat in England so long as our ports are permitted to remain open; and until it can be shown that wheat can be profitably grown in this country at these prices, the agricultural interest cannot be regarded as on a sound and secure footing.

At present, circumstances are rather in favour of a moderate rise in the value of grain, but a temporary improvement does not affect the general bearings of the case, and we feel perfectly convinced that, in a series of years, quotations would be found to range below rather than above the present level, as there can be no question that the new markets opened to the foreigner have already given an impetus to agriculture abroad, and that corn will be more extensively grown from year to year, both in Europe and America. It will be well for farmers to keep these matters in mind when they enter into fresh arrangements with their landlords, and to regard the possibility of high prices with free trade as a perfect anomaly. Our belief is, that nothing short of a continental war, or a general failure of the crops in one and the same year all over the world, would produce such a state of things, either of which calamities we trust we shall not be visited with. So much for the future: our business must now be with the past.

In taking a retrospect of the course of the grain trade since our last, the most prominent feature is the falling off in the supplies from abroad, the imports having been much less liberal than for some months past. This is, however, not unexpected, and is attributable to the advanced period of the year, the time having now arrived when shipments from the northern ports of Europe are attended with extra risk, to say nothing of the increased expenses in having to pay higher freights, and enhanced premiums of insurance. By the official account of the quantities of corn and flour imported into Great Britain, during the month ending 5th November, it appears that 527,846 qrs. grain and pulse, and 596,253 cwts. flour and meal were entered for consumption, against 832,091 qrs. and 512,344 cwts. in the preceding month, ending 5th October; but this we do not regard as affording fair data for judging of the imports, as the comparison should,

in our opinion, be with the corresponding month in last year, when the figures will be found to stand thus—

	Month ending Nov 5, 1850.	Month ending Nov. 5, 1849.	Increase.	Decrease.
Wheat ..	309,181 qrs.	154,193 qrs	154,988 qrs.	—
Barley ..	57,381	50,640	6,741	—
Oats.....	71,785	56,626	15,159	—
Rye	98	886	—	788 qrs.
Peas	20,701	13,680	7,021	—
Beans	32,056	15,803	16,253	—
Maize.....	36,411	101,050	—	64,639
Flour	595,834 cwt5	196,098 cwt5.	399,736 cwt5.	—

We have, however, so long been accustomed to receiving nearly a million of quarters per month, that a falling off, though naturally looked for at this season, has sufficed to restore some degree of confidence, and within the last week or two prices of wheat and flour, as well as those of spring corn, have tended upwards at the principal provincial, as well as at the metropolitan markets. That low prices have induced an extraordinary large consumption cannot be questioned, and considering the enormous extent of the imports during the summer the stocks of foreign grain on hand are much less than might be expected. The quantity of wheat and flour in warehouse has certainly accumulated more or less of late; but the supplies of barley and oats have gone into consumption almost as fast as they have come to hand, and unless the deliveries from our own growers should become much more liberal than heretofore, any decrease in the arrivals of foreign corn will speedily make itself felt, and the prospects are therefore that a temporary rise may occur in the value of the principal articles during the approaching winter.

At Mark Lane business remained very quiet during the first fortnight in November, but the confidence of holders gradually increased, and latterly the tendency of prices has been decidedly upwards.

The supplies of wheat coastwise into London have been very moderate, scarcely averaging 3,000 qrs. per week. The quantity brought forward by land-carriage samples from the home counties has likewise been small, and having in addition to the local inquiry from the town millers, had some demand for shipment to Yorkshire, the supplies have been easily cleared off. Until about the 18th inst. quotations remained nearly stationary for all qualities of English wheat, but on that occasion the quantity on sale was barely equal to the demand, and prices fully 1s. per qr. above those previously current were realized. This advance was well supported during the succeeding week, but on Monday last (25th Nov.) the trade again became rather dull. Good runs of Kentish and Essex red wheat are at present worth 41s. to 43s., and the best white 47s.

to 49s. per qr., showing a rise of about 2s. per qr. on the rates current at the close of last month. The wet weather lately experienced has acted very detrimentally on the condition of the new wheat, or the advance would probably have been more readily paid than it has.

The arrivals of foreign wheat at this port have been comparatively trifling since the end of October, but this may be partly attributed to the prevalence of strong westerly and southerly gales, which have prevented vessels from the north and east making their passage. That there are still a good many corn laden ships bound for British ports on the voyage from the Baltic is certain, and we believe that some quantity of wheat, Indian corn, and beans, may be looked for from places lying east of Gibraltar. A proportion of the wheat will perhaps come to London, but the Indian corn is mostly destined for Ireland.

The falling off which has taken place in the supplies of foreign wheat, and the belief that the receipts will, for several months, be on a much more moderate scale than they have been of late, have rendered holders firm, and very little anxiety has been manifested to realize. In many cases, importers have preferred landing to selling from on board ship, in hopes of higher prices hereafter; but up to the present time the inquiry has not been sufficiently extensive to allow of any advance of importance being established. The fact is, that a fair proportion of the wheat here has been imported by millers, who have, therefore, little need to appear on the market as buyers, and, as yet, we have not been visited by many country purchasers.

In comparing present prices with those current a month ago, a rise of about 1s. per qr. is shown on some qualities, whilst others are scarcely any dearer than they were at the close of October.

Large arrivals of Polish Odessa wheat off the coast caused a decline in prices of floating cargoes, and some sales were made early in the month at 35s. 6d. to 36s. per qr., cost, freight, and insurance. Since then, however, prices have rallied, and fine qualities could not at present be bought below 37s. per qr. The greater part of this wheat has been taken for Ireland, and some for Bristol and Gloucester, but very few cargoes have been ordered on to London.

No change has taken place in the top price of town-manufactured flour, and wheat having been less easy to buy, the millers' profits have not been so good as before; they have, however, had a tolerably good sale for household and number two flour, at rather higher terms than those previously obtained. The value of country households has also tended upwards; the supplies coastwise and per rail having been only moderate, owing in some

measure to the want of water, many of the streams and water-courses having become very low previous to the late copious fall of rain.

Of foreign flour we have had good arrivals, principally from France, and the prospects are that we shall continue to receive supplies from that country throughout the winter. The best qualities have been in fair request, and have sold on terms fully equal to those obtained for similar sorts of home-manufacture; but the commoner grades are beginning to be regarded with suspicion by the bakers, a considerable quantity of the late shipments from France having proved very inferior. Prices range at present from 28s. up to 33s. for good, and 34s. to 35s. per sack for fine Paris whites. The bulk of the American flour has gone to Liverpool, the quantity received here bearing a very small proportion to the total supply. The best brands have sold at 22s. to 24s., and the ordinary sorts from 20s. to 22s. per barrel. The quantity is not equal to that of previous years.

Barley of home growth has come to hand rather sparingly, and of that which has been received only a small portion has proved to be fit for malting purposes.

The opinion we ventured to express in our last monthly article, respecting the probable course of prices, has been thus far verified. It is tolerably clear that the last crop of this grain will afford comparatively little fine quality, and, as that grown abroad is not generally fit for making malt, the best descriptions are likely to rule relatively high. Since our last a further rise of 1s. to 2s. per qr. has been established, 30s. to 32s. per qr. having been paid for superior samples. Other sorts of barley have participated in the advance, though not to the same extent, distilling and grinding qualities being only about 1s. per qr. dearer than they were at the close of October.

The arrivals from abroad have fallen off materially since our last, and, as all the continental advices agree in stating that the crops abroad are short, and prices relatively higher than in this country, we can scarcely calculate on renewed imports to any extent. Under these circumstances, holders of foreign have raised their pretensions; and for heavy feeding barley, weighing 52 lbs. to 54 lbs. per bushel, such as was worth about 22s. per qr. last month, 23s. to 24s. per qr. has lately been realized. A few small lots, suitable for malting, have brought higher rates, say 26s. up to 28s. per quarter.

The continued advance in barley has not been without influence on malt, and the inquiry for the article has been sufficiently active to enable sellers to establish a rise of 1s. to 2s. per qr. The new is not so much esteemed as that of last year's make,

and the latter has brought more money than the former.

The London market has been very scantily supplied with oats. Not only have the arrivals coastwise and from Scotland been small, but the Irish receipts have failed to increase so as to compensate for the falling off in the foreign arrivals, and the dealers have therefore had to draw rather largely on their stocks. The bare state of the market has rendered the large buyers particularly cautious in their operations, a hope being entertained that with a change of wind a better supply may yet come to hand from abroad. Meanwhile needy purchasers have had no alternative but to comply with the demands of sellers, and rather an important advance has been established. Until the 11th inst. buyers resisted, and quotations remained much the same as before, but on that day a rise of 6d. per qr. took place, which was followed by a further improvement of 1s. per qr. on the 18th, and on Monday last the rates of that day week were steadily supported. On the latter occasion good English and Scotch feed sold at 20s. to 21s., and fine at 22s.; black Irish brought 16s. to 17s., and fine white 20s. to 21s. per qr., whilst Scotch potato were held at 23s. to 25s. per qr., and even higher. The entire supply from abroad during the month has hardly exceeded 20,000 qrs., which is less than we have been accustomed to receive weekly. The quantity of really sweet foreign corn remaining on the market is small, and the stale qualities have not improved in value in the same proportion as the finer kinds; still prices for all sorts of oats have advanced, and unless the receipts from Ireland undergo a material increase, a further rise must be looked for. The large dealers will no doubt hold off as long as they possibly can, but these stocks are already much reduced, and as the consumption of oats usually increase during the winter months, we do not see how the upward movement in prices can be checked if the Irish and foreign supplies continue so moderate as they have been of late.

The supplies of beans have about kept pace with the demand, and their value has not varied materially; within the last week or two holders have displayed rather more firmness, owing to the advance in oats, which they expect will ere long occasion a better demand for beans. Egyptians have been in steady consumptive request at about former rates, say 22s. to 23s. per qr.

The transactions in peas have been on a much more retail scale this month than in October, but there has been no pressure on the market. The large supplies which were then received from abroad, and almost immediately cleared off the market, remain in the hands of speculators, who are not apparently willing to resell except at a profit, which they

have hitherto been unable to obtain. Meanwhile the receipts of home-grown peas have been small since the close of October, and prices have rallied more or less. The downward movement was not arrested till the 11th instant, and good boilers were at one time sold as low as 30s. per qr.; since then, however, the value has crept up 1s. to 2s. per qr., and the market has at present an appearance of firmness, indicative of a further improvement so soon as the weather shall have become cold.

Nothing of consequence has been done in Indian corn on the spot; indeed, hardly any of the arrivals come to this port, and the business in the article is principally confined to free-on-board sales—the cargoes being mostly destined for Ireland. The highest price paid was in the beginning of the present month, viz., 31s. 6d. per qr., cost, freight, and insurance, for Galatz. Subsequently a decline from that point of about 1s. per qr. took place, and since then a small rally—there being at present no sellers of the quality named, below 31s. per qr. The consumption of Indian corn in Ireland is steadily increasing, and that country is likely to take all that may come to hand. The potato failure has fortunately proved to be less extensive in the sister isle than was at one time feared; but the yield of wheat was unquestionably very short in all parts of the island, and there can be no doubt that very large imports of food will be required all through the winter.

Our advices from the Continent of Europe do not vary in character materially from what they were when last we addressed our readers. Notwithstanding the discouraging tone of the English letters, and a falling off in the demand for shipment to Great Britain, prices have scarcely varied at any of the leading ports in the Baltic. At Danzig a tolerable amount of business has been done during the month; but at most of the other markets the transactions have been comparatively unimportant. Quotations abroad are too nearly on an equality with prices in this country to hold out inducement to make consignments or to encourage English speculators to purchase largely on the continent. This, and the advanced state of the season, accounts for the trifling nature of the operations at the leading continental markets.

The most recent accounts from Danzig are of the 20th inst. During the preceding week rather increased supplies of wheat had been brought forward by the farmers of the surrounding neighbourhood, which had occasioned a small decline in prices. The inferior runs of new weighing 58 to 59 lbs. per bushel had sold at terms equal to 35s. to 36s., and fair parcels of 60 lbs. weight at 37s. to 38s. per qr., free on board. Holders of fine high-mixed old wheat in granary had, however, manifested no dis-

position to make the slightest concession, and for the best runs weighing 62 lbs. equal to 43s. to 44s. per qr., free on board, had been demanded. Freight rates were still moderate for the time of year—charters having been closed a few days previous at 3s. 6d. per qr. for London and the east coast.

In spring corn there had been little doing for export—higher rates having been paid by local buyers than were allowed to be given by the limits of the few foreign orders which had come to hand.

At Königsberg, on the 18th inst., quotations were almost precisely the same as they were at the corresponding period of last month. Some purchases of wheat had been made there from time to time on Scotch account, which had prevented prices giving way, and had sufficed to clear off most of the supplies brought forward by the farmers. The rates paid had been 38s. 6d. for high mixed, 36s. for good mixed, and 35s. for mixed and red: weight varying from 60½ to 61½ lbs. per bushel. Barley had been in fair request: large, of 52 lbs. weight, had realized 17s., and small, weighing 50 lbs., 15s. per qr., free on board. In other articles there had not been much passing. Oats had brought equal to 13s. to 13s. 6d. per qr. for local consumption.

From Stettin we learn that the growers, after having finished wheat sowing, had brought rather larger supplies to market, and that the commoner sorts of new wheat had consequently become somewhat easier to buy. Fair qualities of old Stettin wheat 61 lbs. weight had been offered at 36s. 6d., and 62 lbs. new Pomeranian and Uckermark at 39s. per qr., free on board.

The letters from Rostock, Stralsund, Greifswald, and Anclam, from all of which ports we are in the habit of receiving a quality of wheat much liked by our millers, report little change in the position of the grain trade. Rostock wheat always obtains the preference in our markets over all other kinds of foreign red, and as more orders are consequently sent there than elsewhere, prices are generally 1s. to 2s. per qr. higher than at any of the neighbouring ports, from whence freights are about the same. The latest quotations from Rostock are 39s. to 40s. per qr. free on board for fine new of 62½ lbs. weight, and 38s. for 61 to 61½ lbs. qualities, whilst at the other places named above, the highest price was only 38s. per qr. free on board.

At the nearer continental ports from whence the expenses of transit to Great Britain are less, the value of wheat is proportionately higher, good red Upland of 61 to 61½ lbs. having been sold at Hamburg, at 41s. to 41s. 6d. per qr. free on board; Rhine wheat at Rotterdam at from 37s. 6d. to 45s. per qr. free on board, weight varying from 60 to

63½lbs. per bushel; and Louvain wheat at Antwerp, of 62lbs. weight, at 43s. 6d. to 44s. per qr.

In France prices continue to be quoted somewhat under what they are at the other near ports, and purchases are therefore still made there from time to time on English account; there is, it is true, little margin for profit on consignments of either wheat or flour from thence; but large profits cannot, under existing circumstances, be expected, and the prospect of obtaining a bare commission is sufficient to induce business. Matters are now altogether on a different footing to what they were formerly, and prices abroad and in this country will, in future, differ only so much as the expenses of transit. This has been the case all through the year, now near its close; still we have received enormous importations, and there is no reason to suppose that the future will differ from the past. Whether our quotations be high or low, we shall always have a pressure of foreign on the markets. The probable result of shipments from the near ports can be pretty clearly calculated; but from the more distant places, imports may be attended with greater loss or profit, according to the turn affairs may take here during the time the vessels are making the passage to our shores.

The recent importations from the Black Sea have, we are inclined to think, for the most part incurred a loss, good qualities having at no period been quoted below 29s. to 30s. per qr. free on board at Odessa, which, with freight and insurance, would bring the price here some shillings per qr. above what the late arrivals have been selling at.

The advices from the Mediterranean present no new feature; at Marseilles, Leghorn, and Trieste some sales of Black Sea wheat have, from time to time, been made for England at about former terms, say 32s. 6d. to 33s. 6d. per qr. free on board for fine Polish, and proportionate rates for other sorts.

By the Canada steam ship we have advices of recent dates from America; though rather large parcels of flour had been taken for shipment to Great Britain, the supplies from the interior had proved fully equal to the demand, and the tendency of prices had been downwards. At New York on the 12th inst., good brands of Genesee flour were obtainable at 4½ to 4¾ dollars per barrel.

CURRENT PRICES OF BRITISH GRAIN AND FLOUR IN MARK LANE.

		Shillings per Quarter.	
WHEAT, Essex and Kent, white, new.	40 to 45 fine up to 50		
Ditto ditto old ..	42 46		50
Ditto ditto red, new. . . .	38 42		44
Ditto ditto old	40 42		45
Norfolk, Lincoln, & Yorksh., red, n.	35 40		42
Ditto ditto old. . . .	40 42		44
Ditto ditto white, new-10	42		46
Ditto ditto old. . . .	42 44		46

		Shillings per Quarter.	
BARLEY, malting, new.	24 26		
Chevalier, new	30 32		
Distilling, new	23 25		
Grinding, old	21 23		
MALT, Essex, Norfolk, and Suffolk, new	45 47	extra	49
Ditto ditto old 46	49		51
Kingston, Ware, and town made, new	49 54		56
Ditto ditto old 50	55		57
OATS, English feed, new.	16 18	fine	20
Potato, old	18 22	extra	23
Scotch feed, new	18 20	fine	21
Ditto, old	20 23	extra	24
Irish feed, white, new	16 18	fine	19
Ditto, old.	20 21	extra	22
Ditto, black, new.	15 17	fine	18
RYE	21 26	old 23	25
BEANS, Mazagan	25 26		28
Ticks.	26 27		30
Harrow.	26 28		32
Pigeon	28 30		33
PEAS, white boilers.	28 32		30
Maple	30 32		32
Grey	28 30		31
FLOUR, town made, per sack of 280 lbs. —	—		35 40
Country marks.	—		28 32

FOREIGN GRAIN.

WHEAT, Dantzic, mixed. . 42 to 45 high mixed	46 48	extra 50
Konigsberg	40 44	45 47 " 48
Rostock, new	43 45	fine old 44 46 " 48
Pomera, Meckbg., and Uckermark, red	42	43 extra 44 45
Silesian	" 40	42 white 42 45
Danish and Holstein	" 38	40 " 40 42
Rhine and Belgium	" 40	44 old 42 45
French	" 38	43 white 40 45
Odessa, St. Petersburg, and Riga.	35 38	fine 38 40
BARLEY, grinding	21 23	
Distilling	23 25	
Malting	25 27	
OATS, Dutch, brew, and Polands	20 22	
Feed	16 18	
Danish and Swedish feed	16 18	
Stralsund	17 19	
Russian	16 17	
BEANS, Friesland and Holstein	25 26	Konigsberg 28 32
PEAS, feeding	24 24	fine boilers 28 30
INDIAN CORN, white	30 32	yellow 28 30
FLOUR, French, per sack	28 32	fine 33 35
American, sour per barrel	20 22	sweet 22 24

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Oct. 19, 1850.	39 10	24 2	16 7	26 7	29 7	29 5						
Oct. 26, 1850.	39 9	24 0	16 8	25 0	28 10	30 0						
Nov. 2, 1850.	40 2	24 1	17 3	23 6	29 1	29 2						
Nov. 9, 1850.	40 5	24 4	17 0	26 7	29 0	29 11						
Nov. 16, 1850.	39 11	24 1	17 2	24 2	28 9	29 0						
Nov. 23, 1850.	39 11	24 1	17 3	29 6	28 9	29 4						
Aggregate average of last six weeks	40 0	24 2	17 0	25 11	29 0	29 7						
Comparative ave. same time last year	40 11	28 5	17 0	23 6	29 5	50 7						
DUTIES.	1 0	1 0	1 0	1 0	1 0	1 0						

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's				Averages from the correspond-			
Gazette.		Av.		ing Gazette in 1849.		Av.	
Wheat	Qrs.	s. d.		Wheat	Qrs.	s. d.	
Barley	95,088	39 11		Barley	89,423	28 3	
Oats	92,257	17 3		Oats	18,427	17 0	
Rye	28	29 6		Rye	193	24 0	
Beans	4,856	28 9		Beans	4,468	29 8	
Peas	2,159	29 4		Peas	2,784	30 7	

PRICES OF SEEDS.

BRITISH SEEDS.

Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.	
Linseed Cakes (per 1,000 of 3 lbs. each) .. £8 0s. to £9 0s.	
Cow Grass (nominal)	—s. to —s.
Trefoil (per cwt.)	14s. to 18s.
Rapeseed, (per last) new £25 to £27	old £— to £—
Ditto Cake (per ton).....	£4 10s. to £5 15s.
Mustard (per bushel) white 6s. to 7s.; .. brown, 8s. to 10s.	
Coriander (per cwt.).....	16s. to 24s.
Canary (per qr.).....new 51s. to 53s., fine 54s. to 57s.	
Tares, Winter, per bush., 4s. 3d. to 4s. 9d.; Spring, nominal.	
Caraway (per cwt.)..... new, 30s. to 32s.; fine 33s.	
Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.	
Cloverseed, nominal.	

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.	
Ditto, white (duty 5s. per cwt.) per cwt.	24s. to 42s.
Linseed (per qr.) .. Baltic 38s. to 44s.; .. Odessa, 42s. to 46s.	
Linseed Cake (per ton).....	£6 0s. to £7 10s.
Rape Cake (per ton)	£4 10s. to £4 15s.
Hempseed, small, (per qr.) 32s. to 33s.; Do. Dutch, 34s. to 36s.	
Tares, (per qr.)..... small 21s. to 24s., large 25s. to 30s.	
Rye Grass (per qr.)	—s. to —s.
Coriander (per cwt)	—s. to —s.

HOP MARKETS.

BOROUGH, MONDAY, NOV. 25.

We have no alteration to notice in our market, which remains heavy, at nominally unaltered quotations.

Sussex pockets

Kent ditto

Mid and East Kents.....

WORCESTER, (Saturday last.)—There is no alteration to note in our market since last Saturday.

POTATO MARKETS.

SOUTHWARK, WATERSIDE, NOV. 25.

Since our last report, owing to contrary winds, the arrivals coastwise have been limited, which enabled salesmen at the end of the week to realize our highest quotations.

The following are this day's prices:—

York Regents.....	80s. to 90s. per ton.
Scotch	55s. to 70s.
Wisbech	65s. to 75s.
French whites.....	65s. to 70s.

COUNTRY POTATO MARKETS.—YORK, Nov. 16.—A good supply, at from 6d. to 7d. per peck. LEEDS, Nov. 19.—A good supply, at from 7d. to 8d. per score. MALTON, Nov. 16.—A moderate supply, at from 4d. to 6d. per peck. RICHMOND, Nov. 16.—Potatoes 2s. per bush. MANCHESTER, Nov. 19.—Potatoes 6s. 6d. to 9s. per 252lbs. DURHAM, Nov. 16.—We had a large supply, at 6d. per peck. CARLISLE, Nov. 16.—A middling supply, at 4½d. to 6d. per st. of 14lbs. SUNDERLAND, Nov. 16.—Now that the potato crop is all but secured, we can confidently state that the take-up is fully an average of former years, or more so, from the great breadth planted, which more than counterbalances the diseased ones, which are, comparatively speaking, very few. In general the quality is excellent. No alteration in prices.

OILS.

Linseed, 32s. 6d. per cwt.; Rapeseed, English, refined, 37s. 6d.; do. foreign, 38s. 6d.; Gallipoli, per tun, 44l.; Spanish, 42l.; Sperm, 88l. to 90l.; do. bagged, 84l.; South Sea, 35l. to 37l. 10s.; Seal, pale, 39l.; do., coloured, 36l.; Cod, 40l.; Cocoa Nut per ton, 38l. to 40l.; Palm, 32l.

PRICES OF BUTTER, CHEESE, HAMS, &c.

	s.	s.		s.	s.
Friesland, per cwt.,	82	to 86	Double Gloucester,		
Kiel	80	84	per cwt.	46	to 54
Dorset	84	—	Single do.	44	52
Carlrow	76	80	York Hams	66	76
Waterford.....	74	78	Westmoreland do. .	68	72
Cork	76	80	Irish do.	54	68
Limerick	72	76	American do.	38	50
Sligo	74	76	Wiltshire Bacon,		
Fresh Butter, per doz.	12	14	green, ...	44	46
Cheshire Cheese, per			Waterford Bacon ..	42	44
cwt., ...	52	70	Hamburgh do.	38	42
Cheddar do.	56	68	American	21	30

BELFAST, (Friday last.)—Butter: Shipping price, 74s. to 80s. per cwt.; firkins, 8½d.; crocks, 8½d. per lb. New Bacon 38s. to 45s.; Hams, prime, 60s. to 64s. per cwt.; second quality, 54s. to 56s.; Mess Pork, 56s. to 58s. per btl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 42s.; Irish Lard, in bladders, 42s. to 48s.; kegs or firkins, 42s. to 43s. per cwt. Pork a free sale.

Nov.	Butter,	Bacon,	Dried Hams,	Mess Pork.
	per cwt.	per cwt.	per cwt.	per btl.
21.	s. d. s. d.	s. d. s. d.	s. d. s. d.	s. d. s. d.
1846	93 0 94 0	54 0 60 0	68 0 74 0	66 0 67 6
1847	87 0 90 0	56 0 66 0	75 0 82 0	77 0 80 0
1848	77 0 79 0	58 0 60 0	70 0 90 0	80 0 82 0
1849	68 0 72 0	44 0 50 0	60 0 84 0	65 0 67 9
1850	71 0 80 0	34 0 44 0	60 0 62 0	58 0 58 0

HIDE AND SKIN MARKETS.

	s.	d.		s.	d.
Market Hides, 56 to 64lbs.....	0	2	to 0	2½	per lb.
Do. 64 72lbs.....	0	2½	to 0	2½	"
Do. 72 80lbs.....	0	3	to 0	3½	"
Do. 80 88lbs.....	0	3½	to 0	3½	"
Do. 88 96lbs.....	0	3½	to 0	4	"
Do. 96 104lbs.....	0	4	to 0	4½	"
Do. 104 112lbs.....	0	4½	to 0	4½	"
Calf Skins, light	1	0	3	0	each.
Do. full	6	0	0	0	"
Horse Hides	5	0	0	0	"
Polled Sheep	4	5	5	5	"
Kents and Half breeds.....	3	7	3	1	"
Downs.....	2	10	4	4	"

FLAX.

BELFAST, (Friday last.)—Our spinners not being anxious buyers, prices are rather easier. Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 37s. to 45s. per cwt.

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Nov. 22.—We have no change to notice this week either in demand or price.

LIVERPOOL NOV. 23.

SCOTCH.—There is so far, no improvement to report in the demand for laid Highland Wool, and only a trifling business at the quotations. White Highland is less enquired for. There is still very little doing in either Cheviots or crossed.

FOREIGN.—The unsettled state of affairs on the Continent has rather checked the general demand, but stocks are very light here, therefore no pressure to realize. The report of the series of public sales now going off in London, being very satisfactory, will tend to give a fresh tone to our market.

END OF VOLUME XXXIII.

